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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR §1.53(c).

INVENTOR(S)		Residence (City and either State or Foreign Country)
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TITLE OF THE INVENTION (500 characters max)		
METHODS AND COMPOSITIONS FOR DISEASE DIAGNOSIS		
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Direct all correspondence to:		
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.		
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<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are:		

Respectfully submitted,

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PROVISIONAL APPLICATION FOR PATENT

under

37 CFR §1.53(c)

TITLE: METHODS AND COMPOSITIONS FOR DISEASE
DIAGNOSIS

APPLICANT: OSVALDO L. PODHAJECER, FERNANDO JUAN PITOSI
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METHODS AND COMPOSITIONS FOR DISEASE DIAGNOSIS

FIELD OF THE INVENTION

The invention relates to methods and compositions for risk assessment,
5 identification, diagnosis, prognosis, and/or monitoring of disease, and for early
therapeutic intervention.

BACKGROUND OF THE INVENTION

It is axiomatic that early diagnosis and concomitant early therapeutic intervention
10 is the key to successful treatment and/or management of most human disorders.
However, many disorders cannot be diagnosed until the pathological process is already
advanced. For example, many solid tumors are usually not clinically detectable before
they can be palpated or visualized by tissue imaging techniques (i.e., when they are at
least 0.5 cm in size), at which time neoplasia may have been present for years. Similarly,
15 the diagnostic criterion for diabetes mellitus (increased fasting plasma glucose levels or
hyperglycemia) identifies the disorder when glucose intolerance (the underlying cause of
hyperglycemia) is already present. In another example, rheumatoid arthritis (RA) is
diagnosed by the presence of joint stiffness and soreness and the presence of positive
rheumatoid factor, all factors that indicate RA is already present and may be advanced.

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Diagnostic Disease Markers

In cancer, progression from preneoplasia to malignancy is accompanied by the
accumulation of genetic changes in the neoplastic cells that lead to histopathological
modifications. In some circumstances, when such a genetic change corresponds to an
25 increase in a protein made by the tumor cells, such a protein can be detected in the tumor
or in body fluids (if secreted from the tumor), and used as a biological tumor marker.
Most tumors have been associated with one or more such tumor markers. Such markers
have been evaluated as potential tools to diagnose cancer, determine prognosis, and/or
monitor cancer progression. However, many tumor markers are detectable only after
30 neoplasia has already progressed to the stage of formation of a tumor. In some cases, a
tumor marker may not be detectable until a tumor is already malignant. Thus, many of

the most widely used tumor markers are used primarily to monitor disease progression or response to treatment rather than for early diagnosis.

In rheumatoid arthritis, anti-cyclic citrullinated peptide (anti-CCP) antibodies, anti-keratin antibodies (AKA) and IgM rheumatoid factors have been suggested as markers for rheumatoid arthritis (Bas et al., Rheumatology (Oxford), 2002, 41(7):809-14). However, the value of such markers remains inconclusive (Scott, Rheumatology (Oxford), 2000, 39(Supp) 1:24-9). Similarly, while several protein and gene markers have been found to correlate with the presence of active diabetes, the use of markers as diagnostic or predictive has not been proven valuable at this time for either type I or type 2 diabetes (see the National Academy of Clinical Biochemistry (NACB) Laboratory Medicine Practice Guidelines: Guidelines and Recommendations for Laboratory Analysis in the Diagnosis and Management of Diabetes Mellitus, 2002, available online at the NACB web site).

Genomics and Proteomics Tools for Disease Diagnosis

The development of high throughput screening approaches such as functional genomics and proteomics has provided a new biological platform to search for molecules associated with different disorders. Gene-expression profiles based on microarray analysis have been of some use to predict survival of patients with lung carcinoma (Beer et al., 2002, Nat. Med., 8(8):816-24). A similar approach identified a group of genes that were said to be useful to predict the clinical outcome of diffuse large B-cell lymphoma following combination chemotherapy (Shipp et al., 2002, Nat. Med., 8(1):68-74). In addition, comparison of the proteomic profile of patients with ovary or prostate cancer compared to non cancerous volunteers was said to have provided a set of serum proteins that might be useful for early cancer detection (Petricoin et al., 2002, Lancet, 2002, 359(9306):572-7; Petricoin et al., 2002, J. Natl. Cancer Inst., 94(20):1576-8).

At present, most functional genomics studies in cancer have used cancer samples obtained from patients to generated cancer-associated gene expression profiles (either by a genomics or a proteomics approach).

A need remains for methods to detect and diagnose disease. Particularly needed are predictive methods and markers for early stage or very early stage disease detection and risk assessment.

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SUMMARY OF THE INVENTION

The methods described herein are based, at least in part, on the discovery that the central nervous system (CNS) exhibits specific changes in gene expression (e.g., changes in patterns of gene expression) in response to the presence of a peripheral (non-CNS) disease or disorder (e.g., a hyperproliferative disorder such as a non-CNS tumor or cancer, an immunological disorder, an inflammatory disorder, a metabolic disorder, or a pathogenic infection). While not bound by any theory, the inventors believe that specific changes in gene expression in the CNS, e.g., in the brain, occur in response to the presence of peripheral disease at an early stage in the development of the disease, e.g., before the disorder is clinically detectable and/or before the subject is symptomatic.

Thus, peripheral disorders can be diagnosed at an early stage and targeted for early therapeutic intervention by analyzing changes or patterns in gene expression in the CNS.

Accordingly, in one aspect, the invention features a method of diagnosing a non-CNS disorder in a subject, such as a human. The non-CNS disorder can be, e.g., a hyperproliferative disorder, e.g., a non-CNS tumor or cancer; an immunological disorder, e.g., rheumatoid arthritis; an inflammatory or allergic disorder, e.g., asthma; a metabolic disorder, e.g., diabetes or obesity; or a pathogenic infection, e.g., a viral infection. The method includes detecting expression of a gene in a CNS sample of the subject, e.g., a brain tissue or cell (such as a tissue or cell of the hypothalamus, the cerebellum, the midbrain, the hippocampus, the prefrontal cortex or the striatum) or a sample of cerebrospinal fluid (CSF). The method optionally includes a step of obtaining the CNS sample. A change in gene expression compared to a reference value, e.g., a control or basal value, is correlated with the presence of a non-CNS disorder. The method is not limiting in that it can be used to detect the risk or presence of any non-CNS disorder. In one embodiment, the non-CNS disorder is not lymphoma.

The subject can be a human. In one embodiment, the human is not symptomatic for the disorder to be diagnosed. In another embodiment, the disorder is not clinically detectable, e.g., it is not detectable by a routine general clinical exam.

Detecting expression of a gene in a CNS sample can include detecting or
 5 determining a value for one or more of: the level of mRNA, rate of transcription, amount of a gene product, and activity of a gene product. In some embodiments, expression of a single gene in the CNS may be detected, where a change in gene expression in that gene is associated with the presence of a non-CNS disorder. In other embodiments, expression of a plurality of genes (e.g., a panel or cluster of genes) may be evaluated, where a
 10 specific profile of gene expression of the plurality of genes is associated with the presence of a particular non-CNS disorder.

The method can include correlating the result of the detecting step to the presence or absence of a non-CNS disorder. "Correlating" means identifying the probability, based on the result of the detecting step, that the subject has or does not have a non-CNS
 15 disorder. Correlating can include generating a dataset from, or providing a record of, the detecting step, e.g., a printed or computer readable record such as a laboratory record or dataset. The record can include other information, such as a specific subject identifier, a sample identifier for the CNS sample, a date, the identity of the operator of the method, and/or other information. The record can be used to provide or store information about
 20 the subject. For example, the record can be used to provide information (e.g., to the subject, a health care provider, the government, or insurance company). The record or information derived from the record can be used, e.g., to identify the subject as suitable or unsuitable for a particular therapy or a particular clinical trial group.

In the methods described herein, gene expression of a CNS gene can be detected
 25 by any technique available to the skilled artisan, e.g., genomics or proteomics microarray analysis of a CNS biological sample, such as brain tissue or CSF; or brain imaging techniques that detect changes in gene expression. In one embodiment, the method involves detecting a CNS gene product released or secreted into the CSF. In such embodiments, an agent (such as an antibody, e.g., a labeled antibody) for detecting the
 30 gene product can be immobilized on a solid phase, e.g., in a dipstick format.

The gene or genes to be evaluated will depend on the specific gene or profile of gene expression associated with a particular disorder. For example, exemplary genes (or profiles or clusters of genes) that are regulated in response to the presence of cancer cells (or particular types of cancer cells) are shown in FIGS. 2-26, *infra*. Such genes are also referred to herein as CNS "marker genes" or "disease surveillance genes" for non-CNS disorders. The exemplary CNS marker genes are not limiting, as the methods described herein can include the detection of any other genes or gene products determined to exhibit a change in expression associated with the presence of a peripheral disorder. CNS marker genes can include, *inter alia*, genes encoding hormones, growth factors, immune system components, and cytokines.

In another aspect, the invention features a method of determining whether a subject (e.g., a human) has, or is at risk for developing, a peripheral (non-CNS) disorder. The method involves providing or obtaining a test gene expression profile for two or more CNS genes in the subject; and comparing the test gene expression profile with a reference gene expression profile (e.g., a reference gene expression profile described herein), wherein the reference gene expression profile is associated with the presence of a particular non-CNS disorder. Non-limiting examples of reference gene expression profiles (e.g., associated with colon, breast or lung carcinoma), are disclosed herein. In one embodiment, the method includes generating a record of the result (e.g., a laboratory record or dataset) of the comparing step; and, optionally, transmitting the record (e.g., by print or computer readable material) to the subject, the subject's health care provider or another party. As with other methods described herein, various techniques can be used to provide a gene expression profile and various types of disorder can be detected.

In another aspect, the invention features a method of treating a subject, e.g., a human, by diagnosing a peripheral (non-CNS) disorder in a subject, e.g., using a method described herein; and administering to the subject a therapeutic agent for the treatment of the disorder, e.g., a chemotherapeutic agent. Because the detection/diagnostic methods described herein can indicate the presence of peripheral disease at an early stage in the pathogenic process (e.g., before a disorder is symptomatic or clinically diagnosable), the methods allow for early intervention to control the disorder, e.g., implementing lifestyle changes to stop or slow further progress of the disease, or by administering a therapeutic

agent to slow or control the progression of the disease. Such agents can advantageously be used at lower dosages than are typically used after a disease is sufficiently advanced to be clinically diagnosed.

In another aspect, the invention features a method of identifying a diagnostic marker gene for a peripheral (non-CNS) disorder in a subject. The method involves:
 5 inducing a non-CNS disorder in a test experimental animal, e.g., a rodent tumor model; comparing expression of a gene in a CNS tissue or cell in the test experimental animal to expression of the gene in a control experimental animal; and selecting as a diagnostic marker a gene (or human homolog of the gene) that is differentially expressed in the test
 10 experimental animal compared to the control experimental animal.

The methods described herein are useful, *inter alia*, for risk assessment for a variety of disorders, for early detection and diagnosis of disease, for monitoring of progression of disease, for monitoring efficacy of treatment for a disease, and/or evaluation of clinical status.

As used herein a "disorder" or "disease" is an alteration in the state of the body or of some of its cells, tissues, or organs, that threatens health. The two terms are meant to encompass all stages of an illness, including the very early stages of an illness (e.g., early alterations in the body that may not be detectable by the subject or a health care provider, but nonetheless set in motion a disease process). For example, the terms "disorder" and
 20 "disease" encompass the state of neoplasia, before a neoplasm or tumor is formed; early immunological reactions to an antigen, e.g., in the development of rheumatoid arthritis or asthma, before inflammation or allergy are symptomatic; and early changes in energy metabolism that promote weight gain, before weight gain is produced.

As used herein, "neoplasia" is an unregulated and progressive proliferation of
 25 cells under conditions that would not elicit, or would cause cessation of, proliferation of normal cells. Neoplasia can result in the formation of a "neoplasm," a new and abnormal growth of tissue. If the abnormally proliferating cells form a mass, a neoplasm is generally referred to as a "tumor." A neoplasm may be benign or malignant (cancerous).

As used herein, the term "matches" or "matching" when referring to a test gene
 30 expression profile and a reference gene expression profile, means that the profiles are sufficiently similar to each other to have an analogous cause or effect. Two profiles are

matching if they are at least 70% identical in reference to the number of genes having similar expression patterns in each profile, or the level of expression of the genes in each profile. In some embodiments, two profiles can be at least 80%, 85%, 90%, 95%, 98%, or more, identical.

5 A "subject" is a human or animal that is tested for the presence of a possible disorder. The animal can be a mammal, e.g., a domesticated animal such as a dog, cat, horse, pig, cow or goat; an experimental animal such as an experimental rodent (e.g., a mouse, rat, guinea pig, or hamster); a rabbit; or an experimental primate, e.g., a chimpanzee or monkey.

10 Although methods and materials similar or equivalent to those described herein can be used in the practice or testing of the present invention, suitable methods and materials are described below. All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety. In case of conflict, the present specification, including definitions, will control. In addition, the
15 materials, methods, and examples are illustrative only and not intended to be limiting.

Other features and advantages of the invention will be apparent from the following detailed description, the drawings, and the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

20 FIG. 1 is a schematic diagram of a slide used in a microarray gene expression assay.

FIG. 2-(1-7) is a table showing the results of cluster analysis I for colon cancer in midbrain. This cluster analysis identified differentially expressed genes ($p < 0.05$) up- or
25 down-regulated at one of two experimental time points after injection of cancer cells into the relevant animal model. Genes with similar expression pattern were clustered using hierarchical clustering techniques. The table lists 407 markers differentially expressed in the midbrain of mice injected with colon cancer cells at one of the two experimental time points studied for colon cancer (72 and 198 hours). Each listed marker gene belongs to
30 one of 12 clusters, as indicated by the left hand column of the table. FIG. 2-8 is a set of cluster graphs that illustrates the relative differential expression of each cluster at each of

the time points tested. In each cluster diagram (in all the figures), the y-axis represents a value for the relative level of gene expression of the cluster compared to control (the midline at 0) and the x-axis represents time. In this case, 1.0 = 72 hours and 2.0 = 198 hours. Thus, expression values below the midline indicates the genes in that cluster are down-regulated at that time. Expression values above the midline indicates the genes in that cluster are down-regulated at that time.

FIG. 3-1 is a table showing the results of cluster analysis II for colon cancer in midbrain. Cluster analysis II identified differentially expressed genes ($p < 0.05$) up- or down-regulated at both experimental time points tested (72 and 198 hours) after injection of cancer cells into the relevant animal model. The table lists 41 markers (in 12 clusters) differentially expressed in the midbrain of mice injected with colon cancer cells at both 72 and 198 hours. FIG. 3-2 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control at each time point.

FIG. 4-(1-15) is a table showing the results of cluster analysis I for breast cancer in midbrain. The table lists 698 markers (in 12 clusters) differentially expressed in the midbrain of mice injected with breast cancer cells at one of the three experimental time points studied (18, 72 and 198 hours). FIG. 4-16 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG. 5-(1-6) is a table showing the results of cluster analysis II for breast cancer in midbrain. The table lists 299 markers (in 12 clusters) differentially expressed in the midbrain of mice injected with breast cancer cells at two or three of the experimental time points studied (18, 72 and 198 hours). FIG. 5-7 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG. 6-(1-14) is a table showing the results of cluster analysis I for lung cancer in midbrain. The table lists 797 markers (in 12 clusters) differentially expressed in the midbrain of mice injected with lung cancer cells at one of the three experimental time points studied. FIG. 6-15 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG. 7-(1-4) is a table showing the results of cluster analysis II for lung cancer in midbrain. The table lists 230 markers (in 12 clusters) expressed in the midbrain of mice injected with lung cancer cells at two or three of the three experimental time points studied. FIG. 7-5 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG. 8-(1-12) is a table showing the results of cluster analysis I for colon cancer in cortex. The table lists 688 markers (in 12 clusters) differentially expressed in the cortex of mice injected with colon cancer cells at one of two experimental time points studied. FIG. 8-13 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the two time points (1.0 = 72 hours and 2.0 = 198 hours) (x-axis).

FIG. 9-(1-2) is a table showing the results of cluster analysis II for colon cancer in cortex. The table lists 58 markers (in 12 clusters) differentially expressed in the cortex of mice injected with colon cancer cells at two or three of the three experimental time points studied. FIG. 9-3 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG. 10-(1-12) is a table showing the results of cluster analysis I for breast cancer in cortex. The table lists 744 markers (in 12 clusters) differentially expressed in the cortex of mice injected with breast cancer cells in one of the three experimental time

points studied. FIG 10-13 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

5 FIG 11-(1-5) is a table showing the results of cluster analysis II for breast cancer in cortex. The table lists 272 markers (in 12 clusters) differentially expressed in the cortex of mice injected with breast cancer cells at two or three of the three experimental time points studied. FIG 11-6 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three
10 time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG 12-(1-12) is a table showing the results of cluster analysis I for lung cancer in cortex. The table lists 828 markers (in 12 clusters) differentially expressed in the cortex of mice injected with lung cancer cells at one of the three experimental time points
15 studied. FIG 12-13 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG 13-(1-5) is a table showing the results of cluster analysis II for lung cancer in cortex. The table lists 311 markers (in 12 clusters) differentially expressed in the cortex of mice injected with lung cancer cells at two or three of the three experimental time points studied. FIG 13-6 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).
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FIG 14-(1-7) is a table showing the results of cluster analysis I for colon cancer in striatum. The table lists 361 markers (in 12 clusters) differentially expressed in the striatum of mice injected with colon cancer cells at one of the two experimental time points studied. FIG 14-8 is a set of cluster graphs that illustrates the relative differential
30 expression of each cluster compared to control (y-axis) at each of the two time points (1.0 = 72 hours and 2.0 = 198 hours) (x-axis).

FIG 15-1 is a table showing the results of cluster analysis II for colon cancer in striatum. The table lists 40 markers (in 12 clusters) differentially expressed in the striatum of mice injected with colon cancer cells in both experimental time points studied. FIG 15-2 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the two time points (1.0=72 hours and 2.0 = 198 hours) (x-axis).

FIG 16-(1-8) is a table showing the results of cluster analysis I for lung cancer in striatum. The table lists 483 markers (in 12 clusters) differentially expressed in the striatum of mice injected with lung cancer cells at one of the three experimental time points studied. FIG 16-9 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 =72 hours and 3.0 = 198 hours) (x-axis).

FIG 17-(1-4) is a table showing the results of cluster analysis II for lung cancer in striatum. The table lists 234 markers (in 12 clusters) differentially expressed in the striatum of mice injected with lung cancer cells at two or three of the three experimental time points studied. FIG 17-5 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 =72 hours and 3.0 = 198 hours) (x-axis).

FIG 18-(1-7) is a table showing the results of cluster analysis I for colon cancer in hypothalamus. The table lists 389 markers (in 12 clusters) differentially expressed in the hypothalamus of mice injected with colon cancer cells in one of the two experimental time points studied. FIG 18-8 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the time points (1.0=72 hours and 2.0 = 198 hours) (x-axis).

FIG 19-1 is a table showing the results of cluster analysis II for colon cancer in hypothalamus. The table lists 51 markers(in 12 clusters) differentially expressed in the

hypothalamus of mice injected with colon cancer cells in both experimental time points studied. FIG 19-2 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

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FIG 20-(1-20) is a table showing the results of cluster analysis I for breast cancer in hypothalamus. The table lists 1252 markers (in 12 clusters) differentially expressed in the hypothalamus of mice injected with breast cancer cells at one of the three experimental time points studied. FIG 20-21 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

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FIG 21-(1-6) is a table showing the results of cluster analysis II for breast cancer in hypothalamus. The table lists 366 markers (in 12 clusters) differentially expressed in the hypothalamus of mice injected with breast cancer cells at two or three of the three experimental time points studied. FIG 21-7 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

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FIG 22-(1-20) is a table showing the results of cluster analysis I for lung cancer in hypothalamus. The table lists 1160 markers (in 12 clusters) differentially expressed in the hypothalamus of mice injected with lung cancer cells at one of the three experimental time points studied. FIG 22-21 is a set of cluster graphs that illustrates the relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

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FIG. 23-(1-6) is a table showing the results of cluster analysis II for lung cancer in hypothalamus. The table lists 306 markers (in 12 clusters) differentially expressed in the hypothalamus of mice injected with lung cancer cells at two or three of the three experimental time points studied. FIG. 23-7 is a set of cluster graphs that illustrates the

30

relative differential expression of each cluster compared to control (y-axis) at each of the three time points (1.0 = 18 hours, 2.0 = 72 hours and 3.0 = 198 hours) (x-axis).

FIG. 24(A)-(C) is a set of tables listing tumor-specific CNS markers differentially expressed, at any time tested, in three different cancer models: colon cancer, 24A; breast cancer, 24B; and lung cancer, 24C. Criteria for inclusion in this figure were (1) the marker corresponds to a secreted product; and (2) a p value below 0.05 for differential expression.

FIG. 25(A)-(E) is a set of tables listing genes identified as CNS markers that are also potential targets for therapeutic intervention for each of colon, breast and lung cancer. Criteria for inclusion in this figure were (1) the marker corresponds to a signaling receptor such as a growth factor, hormone, or cytokine; and (2) a p value for differential expression below 0.05.

FIG. 26 is a table listing CNS markers differentially expressed at least in one time point studied in all tumors analyzed.

DETAILED DESCRIPTION

The methods described herein rely, in part, on the detection of gene expression in the CNS to identify (e.g., diagnose or monitor) peripheral (non-CNS) tissues or organs for early stages of disease (e.g., in some cases, within hours, days, weeks or months of the appearance of disease). Early identification and/or diagnosis of disease provides an opportunity for early therapeutic intervention to target the disorder before it becomes overly advanced or aggressive.

General Methodology

The CNS is involved in the body's response to any internal or external stimulus that by its intensity or functional relevance could alter internal homeostasis. As part of this function, the CNS and the immune system interact to obtain a suitable immune response when necessary.

An immune response impacts the brain via neural and humoral mechanisms.

Neural mechanisms primarily involve the activation of the vagal nerve. Humoral mechanisms can include cytokine-mediated action directly on brain structures, e.g., cytokine-mediated increases on neural firing rates (Rothwell and Hopkins, 1995, Trends Neurosci 18(3):130-6; Wang et al., 2003, Nature, 421(6921):384-8). In one example, peripheral cytokines have been shown to bind and activate the vagal nerve, which in turn activates neurons of the nucleus of the tractus solitarius and the hypothalamus in the brain (Watkins and Maier, 1999, Proc. Natl. Acad. Sci. USA, 96(14):7710-3).

Humoral signals from the periphery act as potent messengers to the brain.

Cytokines in the brain can exert their action at a much lower dose than in the periphery. For example, intracerebral administration of interleukin-1 (IL-1) at a dose of 100 pg to 10 ng elicits maximal changes in fever, gastric function, increased metabolism and behavioral changes, while several micrograms of this cytokine are necessary to elicit similar responses when administered to the periphery (Rothwell and Hopkins, *supra*).

After sensing an internal immune signal, the brain reacts in different ways. A paradigm of CNS response to immune signals is the activation of neuroendocrine axes such as the hypothalamus-pituitary-adrenal axis. The activation of this axis results in the liberation of glucocorticoids, which in turn can modulate the ongoing immune response in under 10 minutes. Vagotomy has been shown to blunt the activation of the HPA axis after intraperitoneal administration of cytokines (Watkins and Maier, *supra*). This feedback mechanism is of high physiological relevance; i.e., inhibition of glucocorticoid production after cytokine release in the periphery usually results in the death of the organism (Besedovsky and del Rey, 1996, Endocr. Rev., 17(1):64-102).

The brain can also sense signals that will affect the immune and other systems from the external milieu. For example, the triggering of a stress reaction can result in the release of glucocorticoids and the attenuation of an ongoing immune response. The effects of stress on the immune system are well documented in animal models and humans (Deinzer et al., 2000, Int. J. Psychophysiol., 37(3):219-32; Marshall et al., 1998, Brain Behav. Immun., 12(4):297-307; Benschop et al., 1996, FASEB J., 10(4):517-24; Sheridan et al., 1998, Ann. N.Y. Acad. Sci., 840:803-8). In addition, there is anecdotal and preliminary evidence that mind/body interventions such as meditation or yoga could

have an influence on the immune system (Cassileth, 1999, CA Cancer J. Clin., 49(6):362-75).

The new methods harness this natural reaction of the CNS as a way to detect peripheral disease at an early stage.

5

Cancer Development

It is generally accepted that a clinically detectable tumor mass is composed of cells that, although abnormal, evade immune surveillance and resist immune system attack. During the time of neoplastic progression, cells are characterized by high mutation rates, reflected, *inter alia*, in phenotypic changes such as downregulation of histocompatibility antigens. A tumor may thus become resistant to a particular therapeutic by clonal selection and proliferation from the tumor mass of a cell clone having a mutation that allows the cell to resist the given therapeutic. The “natural selection” of tumor cell clones occurs at a given rate leading to the appearance of malignant cells having genetic and epigenetic traits that facilitate growth and escape from the immune system. It is estimated that the average malignancy contains more than 10,000 mutations (Stoler et al., 1999, Proc. Natl. Acad. Sci., USA., 96(26):15121-6). Therefore, it can be concluded that the antigen profile of established cancers by no means reflects the cell genotype and phenotype of very early stage neoplasia. Moreover, it is reasonable to assume that tumor antigens present in the established cancer and the response they can induce in the organism will be different than the antigens and responses induced by early stage neoplastic cells. The new methods can detect such early stage neoplastic cells in spite of these obstacles.

Some neoplasms, e.g., some cancers (e.g., certain types of carcinoma) can grow for long periods (e.g., for 1, 2, 5, 10, 15, 20 or 25 years) before they are clinically detectable using prior known technology and/or before they become malignant. This period provides an extraordinary window of opportunity for detection of cancerous cells before the malignant tumor is clinically detectable by current strategies. During this period tumor cells undergo several modifications at the molecular level as a result of their genomic instability.

30

Each genetic change is potentially selective for proliferation and/or is capable of triggering a new "alarm signal" to recruit and activate local innate and adaptive immune responses. In a simple view, 10,000 alarm signals might be produced during the 10 to 15 years of tumor development before the tumor is clinically detectable.

5

Development of Rheumatoid Arthritis

Rheumatoid arthritis (RA) is an acquired autoimmune disease in which genetic factors appear to play a role. RA occurs in 1-2 percent of the general population and is found world-wide. Females with RA outnumber males by 3:1. Onset of the disease in
10 adults is usually between the ages of 40 to 60 years, although it can occur at any age.

RA involves Th1 lymphocytes and macrophage infiltration into joints as well as the presence of rheumatoid factors in patients' serum (Chernajovsky et al., 2000, *Genes Immun.*, 1:295-307). Degradation of cartilage is accompanied by the outgrowth of synovial membrane (pannus). This process is generally regulated by IL-1 and TNF- α ,
15 while TGF- β and IL-10 counteract this effect (Chernajovsky et al., *ibid*). Susceptibility to arthritis has been correlated with MHC class II locus, in particular HLA-DR4 in 70 percent of patients with RA (Chernajovsky et al., *ibid*). Rheumatoid Factor(s) (RF) are antibodies to IgG, and are present in 60-80 percent of adults with the disease. High titers of RF are usually associated with more severe and active joint disease, greater systemic
20 involvement, and a poorer prognosis for remission.

An unknown antigen is thought to initiate the autoimmune response resulting in RA. It has been suggested that there is a synovial antigen resembling a bacterial lipopolysaccharide (LPS) of arthritogenic bacteria that initiates the autoimmune response (Kennedy, 2000, *Med. Hypotheses*, 54(5):723-5). TNF- α appears to be the driving force
25 behind the chronic inflammation characteristic of RA. TNF- α plays also an important role in B cell maturation which appears to participate in disease progression (Chernajovsky et al., *ibid*). Some data also strongly indicate a role for Suppressor of Cytokine signaling (SOCS) in disease outcome (Egan et al., 2003, *J. Clin. Invest.* 111(6):915-24).

The initiation of the autoimmune response and/or the initiation of the inflammatory mechanisms in the early development of RA are likely to trigger signals detected by changes in gene expression in the CNS.

5 Development of Asthma

Asthma is an inflammatory airway disease characterized by the presence of cells such as eosinophils, mast cells, basophils, and CD25+ T lymphocytes in the airway walls. Chemokines attract cells to the site of inflammation and cytokines (Interleukin (IL)-4, IL-5, IL-10 and IL-13) activate them, resulting in inflammation and damage to the mucosa.

10 When asthma becomes chronic, secondary changes occur, such as thickening of basement membrane and fibrosis. IL-4 and other cytokines such as TGF- β may be involved in tissue remodeling and the fibrotic response.

In allergic asthma (also known as extrinsic asthma), the initiation event of airway inflammation is an immunological reaction to allergen. Continued exposure to allergen
15 results in chronic inflammation. Allergic asthma affects about 3 million children (8 to 12 percent of all children) and 7 million adults in the United States at a cost estimated at \$6.2 billion a year. It has been suggested that longitudinal studies based on yet unidentified inflammatory markers will guide asthma management in the future (Wilson, 2002, Curr. Opin. Pulm. Med., 8(1):25-32).

20 In the development of asthma, the initiation of the allergic or inflammatory response, e.g., release of cytokines and/or chemokines, can likely trigger signals detected by changes in gene expression in the CNS.

Development of Obesity

25 Body size and body weight are highly heritable traits. Association studies performed with populations of monozygotic and dizygotic twins, non-twin siblings and adoptive family members indicated that the variance for body mass index (body weight divided by height to the square) is much lower in identical twins than in any other group, indicating that genetic factors rather than environmental effects are the key determinant
30 of human adiposity (Maes et al., 1997, Behav. Genet., 27:325-351; Allison et al., 1996, Int. J. Obes. Relat. Metab. Disord. 20:501-506). Diet-induced obesity is also highly

heritable. A pioneer study performed in 12 pairs of young adult identical twins overfed by 1,000 kcal per day during a 100-day period demonstrated that overfeeding induced a variable increase in body weight in all volunteers. However, twin pairs had six times less variance in mass increase than non-twin pairs, indicating that adaptation to long-term overfeeding has important genetic factors (Bouchard et al., 1990, N. Engl. J. Med. 322:1477-1482). The strong genetic predisposition to gain weight after ingesting a fat-rich diet is even more clearly observed in the laboratory when testing mice or rats of different genetic backgrounds (Schaffhauser et al., 2002, Obes. Res. 10:1188-1196). Most strains of mice maintain their body weight throughout relatively long periods of time while being fed *ad libitum* with low fat diets. However, when fed *ad libitum* with a high fat diet, some strains develop a considerable increase in body mass and some other strains are resistant to this increase regardless of increase in food consumption (West et al., 1995, Am. J. Physiol., 268:R658-R665; Prpic et al., 2003, Endocrinology, 144:1155-1163).

The regulation of body weight involves a large number of interconnected peripheral and brain circuits that participate in the control of energy balance throughout the entire organism (Spiegelman and Flier, 2001, Cell, 104:531-43). Information about the amount of energy stored in the whole body is transported into the brain by peripheral hormones such as leptin and insulin. The relative variation of the plasma concentration of these hormones is interpreted by central mechanisms to induce signals of appetite or satiety (Friedman and Halaas, 1998, Nature, 395:763-70). Other molecules such as ghrelin and cholecystokinin (CCK) enter into the brain after being released from different portions of the gastrointestinal tract and provide essential information to brain centers about the nutritional status of the organism (Murakami et al., 2002, J. Endocrinol., 174:283-288; Sheng and Moran, 2002, Neuropeptides, 36:171-181).

The hypothalamus, a critical brain area for the complicated control of energy homeostasis, integrates a variety of converging signals within a short time frame. In the ventral hypothalamus a group of appetite-inducing neurons expresses the neuropeptide Y (NPY) gene. As leptin levels drop from circulation NPY is released into the paraventricular nucleus of the hypothalamus to induce food intake (Widdowson et al., 1999, Peptides, 20:367-372). A single intracerebroventricular administration of NPY in

mice or rats can dramatically increase food intake for many hours (Zarjevski et al., 1993, Endocrinology, 133:1753-1758). Conversely, another group of neurons located in the arcuate nucleus of the hypothalamus expresses the proopiomelanocortin gene (POMC). These neurons also express the leptin receptor gene. After an excessive intake of fat-enriched food, the levels of triglycerides rise, filling peripheral adipocytes with fat stores. This leads to an increase in production of leptin, which is released into the circulation and eventually enters the brain by a selective uptake mechanism (Hileman et al., 2002, Endocrinology, 143:775-783). Leptin stimulates leptin receptors located in POMC neurons, thereby increasing their firing activity (Cowley et al., 2001, Nature, 411:480-484).

One of the active peptides produced by the POMC precursor is α -melanocyte stimulating hormone (α -MSH). Upon stimulation of leptin receptors, α -MSH is released in the paraventricular nucleus of the hypothalamus to induce satiety. Intracerebroventricular injections of α -MSH in mice or rats induce long lasting anorexia that can promote the death of the animals if they are not forced to feed (Fan et al., 1997, Nature, 385:165-168).

The hormones, neuropeptides and their receptors described above are only a few examples of the many gene products that participate in the central control of energy balance. Regulation of a molecule involved in energy control (e.g., a disruption associated with propensity or presence of obesity) can likely trigger signals that result in changes in gene expression in the CNS.

While not limited by any theory, the methods described herein are based, in part, on the discovery that the CNS senses the presence of "alarm signals" from peripheral (non-CNS) disorders at an early stage in the development of disease progression. Thus, the methods described herein relate to diagnosing peripheral disorders by detecting gene expression in the CNS, e.g., in a CNS sample from a subject, such as a human. In one aspect, a non-CNS disorder can be identified based on a profile of gene expression in the CNS (e.g., the brain) within hours, weeks or months after disease progression is initiated in the body. In some embodiments, a non-CNS disorder can be identified based on a profile of gene expression in the CNS (e.g., the brain) within one or more years (e.g., 2,

3, 5, 7, 10 or more years) after disease progression is initiated in the body, but before a disorder is clinically detectable and/or in an advanced stage.

Methods Of Detecting Gene Expression

5 Gene expression in the CNS can be detected in vitro, e.g., in an isolated CNS sample, or in vivo, e.g., using in vivo imaging techniques.

Central Nervous System (CNS) Samples

10 The CNS refers to the brain (including the cranial nerves) and spinal cord. A CNS sample can be, e.g., a cell or tissue from the brain or spinal cord, or a sample of the cerebrospinal fluid (CSF) that fills the ventricles of the brain and the central canal of the spinal cord.

15 Where the detection of gene expression is to be done in a CNS sample isolated from the subject, a CNS sample can be obtained by any number of methods available to the skilled artisan. For example, a CNS cell or tissue sample can be obtained from the brain, e.g., by needle biopsy or by open surgical incision. Imaging of the brain can be performed to determine the precise positioning of the needle or scalpel to enter the brain.

20 In one example, known as stereotactic biopsy, a tiny hole is drilled into the skull with the patient under light sedation or general anesthesia, and a needle is inserted into the brain tissue guided by computer-assisted imaging techniques such as computerized tomography (CT) or magnetic resonance imaging (MRI) scans. The needle is used to remove a sample of cells, whose gene expression can then be detected by a routine assay, e.g., a gene expression assay described herein. In another example, a sample of CSF can be obtained by routine methods, such as by lumbar puncture. This procedure can be done
25 on an outpatient basis, e.g., under local anesthetic.

30 The number of cells or amount of CSF needed to perform a particular gene expression assay on a CNS sample will vary; however, some techniques, such as PCR based techniques, will require a very small number of cells, e.g., as few as 10 to 100 cells (Klein et al., Nat. Biotechnol., 20(4):387-92, 2002). The CNS sample can be used immediately in a diagnostic test described herein, or it can be stored, e.g., cooled or frozen, and/or transported to a facility where the diagnostic test is performed.

Nucleic Acid-Based Methods

In one embodiment, the methods described herein will utilize techniques for detection of gene expression where a polynucleotide (such as an RNA, mRNA, DNA, cDNA, or other nucleic acid corresponding to the gene) is detected. It should be understood by the skilled artisan that many methods for nucleic-acid based detection of gene expression exist and that any suitable method for detection can be used. Typical assay formats utilize nucleic acid hybridization and include, e.g., 1) nuclear run-on assay, 2) slot blot assay, 3) northern blot assay, 4) magnetic particle separation, 5) nucleic acid or DNA arrays or chips (also discussed in more detail below), 6) reverse northern blot assay, 7) dot blot assay, 8) in situ hybridization, 9) RNase protection assay, 10) ligase chain reaction, 11) polymerase chain reaction (PCR), 12) reverse transcriptase (RT)-PCR, and 13) differential display RT-PCR (DDRT-PCR) or any combination of any two or more of these methods. Such assays can employ the use detectable labels such as radioactive labels, enzyme labels, chemiluminescent labels, fluorescent labels, or other suitable labels, to detect, identify, or monitor the presence or level of a particular nucleic acid being detected. Such techniques and labels are known in the art and widely available to the skilled artisan.

In an exemplary embodiment, an RNase protection assay can be utilized in the methods described herein by hybridizing multiple DNA probes corresponding to one or more members of a panel of sequences to mRNA isolated from a CNS sample from a subject to be tested. The expression profile for one or more genes from the CNS sample can be compared to a reference profile, e.g., a basal pattern of expression, or other negative or positive control (e.g., a profile from a patient known to have no peripheral disease, or a standard or average profile derived from subjects known to not have the particular disorder being tested). In one example, the gene expression profile from the test CNS sample is compared to a reference gene expression profile that is associated with the presence of a non-CNS neoplasia. If the test gene expression profile matches the reference gene expression profile, it indicates that the subject has, or is at risk for developing, the non-CNS neoplastic disorder.

The methods described herein are also well suited for polymerase chain reaction (PCR)-based methods. PCR-based methods include RT-PCR (U.S. Patent No. 4,683,202), ligase chain reaction (Barany, Proc. Natl. Acad. Sci. USA, 88:189-193, 1991), self-sustained sequence replication (Guatelli et al., Proc. Natl. Acad. Sci. USA, 87:1874-1878, 1990), transcriptional amplification system (Kwoh et al., Proc. Natl. Acad. Sci. USA, 86:1173-1177, 1989), Q-Beta Replicase (Lizardi et al., BioTechnology, 6:1197, 1988), rolling circle replication (Lizardi et al., U.S. Patent No. 5,854,033), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques known in the art. PCR amplification of mRNAs expressed in a CNS sample can be performed directly from mRNA isolated from the sample, or from cDNA reverse-transcribed from such isolated mRNA. The amplified nucleic acid can then be hybridized to a particular probe of interest, e.g., a probe for a CNS gene as described herein, in order to determine its expression. The probe can be disposed on an address of an array, e.g., an array described herein below. Such methods are routine and are particularly amendable to routine adaptation to automated systems employing computer controlled reagent aliquoting and signal detection. See, e.g., Klein et al., Nat. Biotechnol., 2002, 20(4):387-92.

In another embodiment, *in situ* methods are used to detect the presence or level of mRNA corresponding to a particular gene. In such methods, a CNS cell or tissue sample can be prepared/processed and immobilized on a support, typically a glass slide, and then contacted with a probe (e.g., a probe for a CNS gene described herein).

In still another embodiment, serial analysis of gene expression, as described in U.S. Patent No. 5,695,937, is used to detect transcript levels of a CNS gene described herein.

Polypeptide-Based Methods

In one embodiment, the methods described herein utilize techniques for detection of gene expression where a gene product (polypeptide) encoded by a gene is detected or where an activity of the polypeptide, e.g., an enzymatic activity, is detected. Such methods are particularly advantageous for detecting the expression of genes that encode polypeptides that are secreted from CNS cells, e.g., into the CSF.

A variety of methods can be used to determine the level of protein encoded by a CNS gene. In general, these methods include contacting a CNS sample (such as a brain cell sample or a CSF sample) with an agent, such as an antibody, that selectively binds to the protein of interest. In one embodiment, the antibody bears a detectable label.

5 Antibodies can be polyclonal, or more preferably, monoclonal. An intact antibody, or a fragment thereof (*e.g.*, Fab or F(ab')₂) can be used. The term "labeled," with regard to the probe or antibody, is intended to encompass direct labeling of the probe or antibody by coupling (*i.e.*, physically linking) a detectable substance to the probe or antibody, as well as indirect labeling of the probe or antibody by reactivity with a detectable
10 substance. Such detection methods can be used to detect a CNS gene product in a CNS sample *in vitro* as well as *in vivo*.

In vitro techniques include immunoassays such as enzyme linked immunosorbent assays (ELISAs), immunoprecipitations, immunofluorescence, enzyme immunoassay (EIA), radioimmunoassay (RIA), Western blot analysis, and LuminexTM x MAPTM

15 detection assay. Some immunoassays are "sandwich" type assays, in which a target analyte(s) is "sandwiched" between a labeled antibody and an antibody immobilized onto a solid support. The assay is read by observing the presence and amount of antigen-labeled antibody complex bound to the immobilized antibody. Another immunoassay useful in the methods described herein is a "competition" type immunoassay, wherein an
20 antibody bound to a solid surface is contacted with a sample (*e.g.*, a CSF sample) containing both an unknown quantity of antigen analyte and with labeled antigen of the same type. The amount of labeled antigen bound on the solid surface is then determined to provide an indirect measure of the amount of antigen analyte in the sample. Such immunoassays are readily performed in a "dipstick" format (*e.g.*, a flow-through or
25 migratory dipstick design) for convenient use. A dipstick-based assay optionally includes an internal negative or positive control. Numerous types of dipstick immunoassays assays are known in the art and are described, *e.g.*, in U.S. Patents 5,656,448; 4,366,241; and 4,770,853. In other embodiments, antibody based assays are performed in an array format. For example, a CNS sample is labeled, *e.g.*, biotinylated, and then contacted to
30 an antibody, *e.g.*, an antibody positioned on an antibody array. The sample can be detected, *e.g.*, with avidin coupled to a fluorescent label.

In vivo techniques include, e.g., introducing into a subject (e.g., into the CSF) a labeled antibody that binds to the gene product to be detected. The antibody can be labeled, e.g., with a radioactive marker, whose presence and location in a subject can be detected by standard imaging techniques.

5 Polyclonal and monoclonal antibodies to be used to detect a particular CNS gene product will, in certain cases, be available. For example, commercially available antibodies exist for many of the CNS marker genes described herein. Alternatively, a skilled artisan can make a suitable antibody for use in a diagnostic assay using routine techniques. Methods of making and using polyclonal and monoclonal antibodies to
 10 detect a particular target are described, e.g., in Harlow et al., Using Antibodies: A Laboratory Manual: Portable Protocol I. Cold Spring Harbor Laboratory (December 1, 1998). Methods for making modified antibodies and antibody fragments (e.g., chimeric antibodies, reshaped antibodies, humanized antibodies, or fragments thereof, e.g., Fab', Fab, F(ab')₂ fragments); or biosynthetic antibodies (e.g., single chain antibodies, single
 15 domain antibodies (DABs), Fv, single chain Fv (scFv), and the like), are known in the art and can be found, e.g., in Zola, Monoclonal Antibodies: Preparation and Use of Monoclonal Antibodies and Engineered Antibody Derivatives, Springer Verlag (December 15, 2000; 1st edition).

20 Imaging of CNS Gene Expression

In one embodiment, the methods described herein utilize techniques for imaging of gene expression, e.g., non-invasive imaging of gene expression, in the CNS. For example, a labeled probe that is capable of detecting the expression of a target gene can be delivered into the brain through the blood-brain barrier (BBB) by targeting the labeled
 25 probe to the brain via endogenous BBB transport systems, such as carrier-mediated transport systems that exist for the transport of nutrients across the BBB. Similarly, receptor-mediated transcytosis systems operate to transport circulating peptides across the BBB, such as insulin, transferrin, or insulin-like growth factors. These endogenous peptides can act as "transporting peptides," or "molecular Trojan horses," to ferry a
 30 labeled diagnostic probe as described herein, across the BBB. The label can then be detected by known brain imaging techniques. Such an approach is described, e.g., in

U.S. Patent No. 6,372,250. In other embodiments, Shi et al., Proc. Natl. Acad. Sci. USA, 2000, 97(26):14709-14 and Lee et al. J. Nucl. Med. 2002, 43(7):948-56 describe imaging of gene expression in the brain *in vivo* using an antisense radiopharmaceutical combined with drug-targeting technology to traverse the BBB.

5 Other methods of delivering into the brain a labeled probe that is capable of detecting the expression of a target gene are described, e.g., in U.S. Pat. No. 5,720,720. This patent describes methods of delivering agents (such as labeled antibodies for imaging gene products) into the brain by high-flow microinfusion.

10 Detection of Changes in CNS Gene Expression in Bodily Fluids

In some cases, gene activation in the CNS can result in a measurable alteration in a gene product at a distant site, e.g., in a fluid such as blood, urine or semen. It is known, e.g., that the cerebral cortex, hippocampus, entorhinal cortex, parts of the thalamus, basal ganglia, cerebellum and the reticular formation influence the output of the
 15 autonomic nervous system (Kandel et al, Principles of Neural Science, Third Edition, Appleton & Lange). These influences could result in measurable alterations of gene expression at the mRNA or protein level in autonomic ganglia or in innervated organs. An example of this type of interaction is the immunomodulatory action of the activation of the vagus nerve after cytokine release in the periphery (Tracey, Nature, 420:853-9, 2002).

20 In addition, gene activation in the CNS can be detected by measuring changes in blood proteins in some cases. For example, neurons in the CNS can trigger the release of hormones in blood via the activation of several neuroendocrine axes such as the hypothalamus-pituitary-adrenal, -gonadal or thyroid axes (Besedovsky and del Rey, Endocrine Reviews, 17:1-39, 1996). Moreover, brain extracellular fluid could drain into
 25 blood and deep cervical lymph (Cserr et al, Brain Pathol., 2(4):269-76, 1992). Cerebral extracellular fluids drain from brain to blood across the arachnoid villi and to lymph along certain cranial nerves (primarily olfactory) and spinal nerve root ganglia. A minimum of 14 to 47% of protein injected into different regions of brain or cerebrospinal fluid passes through lymph. Thus, CSF markers could drain into, and be detected in,
 30 lymph, blood or serum. Such markers found in blood may also be enriched, and thereby detectable, in urine, due to selective filtration of blood components by the kidneys.

The CNS is connected to the testis via the autonomic nervous system as well as the endocrine system. If a change in gene activity in the brain results in modifications in the activity of the hypothalamus-pituitary-gonadal axis or in the innervation of the testes, these changes could be then detected in fluids related to the testes, such as semen. For example, patients with spinal cord injury have been shown to have alterations in the composition of their semen (See Naderi and Safarinejad, Clin. Endocrinol., 58(2):177-84, 2003).

Routine methods can be used to identify gene products in peripheral tissues, such as peripheral bodily fluids, which are the result of changes in gene expression in the CNS. For example, a candidate marker gene can be disrupted in the brain of an experimental animal. A change in the expression of a candidate gene in a peripheral tissue in the experimental animal, compared to a wild type animal, indicates that the expression of the candidate molecule in the peripheral tissue is tied to changes in gene expression in the CNS.

Arrays

The methods described herein are readily adapted for nucleic acid or protein arrays, e.g., nucleic acid and/or protein "chips," following the methods and teachings known in the art. In a typical embodiment, an array chip includes multiple probes (e.g., DNA probes and/or antibody probes) for detection of expression of multiple CNS genes. In one embodiment, the probes on a specific chip are chosen to detect the members of one or more specific panels or "clusters" of genes, each cluster being associated with a specific gene expression profile if a non-CNS neoplasia is present in the subject from whom the CNS sample was taken. A chip can contain tens, hundreds, or thousands of individual probes immobilized (tethered) at discrete, predetermined locations (addresses or "spots") on a solid, planar support, e.g., glass, metal, or nylon. An array can be a macroarray or microarray, the difference being in the size of the spots. Macroarrays contain spots of about 300 microns in diameter or larger and can be imaged using gel or blot scanners. Microarrays contain spots less than 300 microns, typically less than 200 microns, in diameter.

For analysis and comparison of profiles of gene expression in the methods described herein, a nucleic acid array can be constructed using nucleic acid probes for at least four, e.g., at least 10, 20, 40, 60, 80 or 100 CNS genes. Such an array can include control probes (i.e., probes for genes whose expression is expected to remain unaffected in a negative sample, e.g., a sample from a subject not having a non-CNS disorder). Typically, such controls or "normal" non-disease samples are obtained from healthy volunteers. Longitudinal studies of healthy volunteers can be performed to confirm that the control samples are from individuals that remained disease free. Such studies can provide the raw data for a database of control gene expression profiles. Such a database can provide a source of normal or control "reference" profiles that can be used in the present methods. Control samples can also be obtained post-mortem from individuals who died for a reason unrelated to the disorder being diagnosed (e.g., individuals who died from an accidental trauma). In such cases, post-mortem samples should be taken as soon as possible after death, e.g., no later than 3 hours after death.

A population of labeled cDNA representing total mRNA from a sample of a tissue of interest, e.g., brain, spinal cord or CSF, is contacted with the DNA array under suitable hybridization conditions. Hybridization of cDNAs with sequences in the array is detected, e.g., by fluorescence at particular addresses on the solid support. Thus, a pattern of fluorescence representing a gene expression pattern in the CNS sample of a particular subject or group of subjects is obtained. These patterns of gene expression can be digitized and stored electronically for computerized analysis and comparison. For example, an array can be used to compare expression of CNS genes in individuals being tested with one or more reference gene expression profiles stored electronically, e.g., in a digital database, where the reference gene expression profile is associated with either the presence or absence of a peripheral neoplasia.

In some embodiments, cDNAs are used as probes to form the array. Suitable cDNAs can be obtained by conventional polymerase chain reaction (PCR) techniques, as described above. The length of the cDNAs can be from 20 to 2,000 nucleotides, e.g., from 100 to 1,000 nucleotides. Other methods known in the art for producing cDNAs can be used. For example, reverse transcription of a cloned sequence can be used (for example, as described in Sambrook et al., eds., Molecular Cloning: A Laboratory

Manual. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989). The cDNA probes are deposited or placed ("printed" or "spotted") onto a suitable solid support (substrate), e.g., a coated glass microscope slide, at specific, predetermined locations (addresses) in a two-dimensional grid. A small
5 volume, e.g., 5 nanoliters, of a concentrated DNA solution is used in each spot. Spotting can be carried out using a commercial microspotting device (sometimes called an arraying machine or gridding robot) according to the vendor's instructions. Commercial vendors of solid supports and equipment for producing DNA arrays include BioRobotics Ltd., Cambridge, UK; Corning Science Products Division, Acton, MA; GENPAK Inc.,
10 Stony Brook, NY; SciMatrix, Inc., Durham, NC; and TeleChem International, Sunnyvale, CA.

The cDNAs can be attached to the solid support by any suitable method. In general, the linkage is covalent. Suitable methods of covalently linking DNA molecules to the solid support include amino cross-linking and UV crosslinking. For guidance
15 concerning construction of cDNA arrays according to the invention, see, e.g., DeRisi et al., *Nature Genetics*, 1996, 14:457-460; Khan et al., *Electrophoresis*, 1999, 20:223-229; Lockhart et al., *Nature Biotechnol.*, 1996, 14:1675-1680.

In some embodiments of the invention, the immobilized DNA probes in the array are synthetic oligonucleotides. Preformed oligonucleotides can be spotted to form a
20 DNA array, using techniques described herein with regard to cDNAs. In general, however, the oligonucleotides are synthesized directly on the solid support. Methods for synthesizing oligonucleotide arrays are known in the art. See, e.g., Fodor et al., U.S. Patent No. 5,744,305. The sequences of the oligonucleotides represent portions of the sequences of a particular gene to be detected above. Generally, the lengths of
25 oligonucleotides are 10 to 50 nucleotides, e.g., 15, 20, 25, 30, 35, 40, or 45 nucleotides.

Also useful in the methods are aptamer arrays. Aptamers are nucleic acid molecules that bind to specific target molecules based on their three-dimensional conformation rather than hybridization. The aptamers are selected, for example, by synthesizing an initial heterogeneous population of oligonucleotides, and then selecting
30 oligonucleotides within the population that bind tightly to a particular target molecule. Once an aptamer that binds to a particular target molecule has been identified, it can be

replicated using a variety of techniques known in biological and other arts, *e.g.*, by cloning and polymerase chain reaction (PCR) amplification followed by transcription. The target molecules can be nucleic acids, proteins, peptides, small organic and inorganic compounds, and even entire micro-organisms.

5 The synthesis of a heterogeneous population of oligonucleotides and the selection of aptamers within that population can be accomplished using a procedure known as the Systematic Evolution of Ligands by Exponential Enrichment or SELEX. The SELEX method is described in, *e.g.*, Gold *et al.*, U.S. Patent Nos. 5,270,163 and 5,567,588; Fitzwater *et al.*, ("A SELEX Primer," *Methods in Enzymology*, 267:275-301, 1996); and
10 in Ellington and Szostak ("In Vitro Selection of RNA Molecules that Bind Specific Ligands," *Nature*, 346:818-22). Briefly, a heterogeneous DNA oligomer population is synthesized to provide candidate oligomers for the in vitro selection of aptamers. This initial DNA oligomer population is a set of random sequences 15 to 100 nucleotides in length flanked by fixed 5' and 3' sequences 10 to 50 nucleotides in length. The fixed
15 regions provide sites for PCR primer hybridization and, in one implementation, for initiation of transcription by an RNA polymerase to produce a population of RNA oligomers. The fixed regions also contain restriction sites for cloning selected aptamers. Many examples of fixed regions can be used in aptamer evolution. See, *e.g.*, Conrad *et al.* ("In Vitro Selection of Nucleic Acid Aptamers That Bind Proteins," *Methods in*
20 *Enzymology*, 267:336-83, 1996); Ciesiolka *et al.*, ("Affinity Selection-Amplification from Randomized Ribooligonucleotide Pools," *Methods in Enzymology*, 267:315-35, 1996); Fitzwater, *supra*.

Aptamers are generally selected in a 5 to 100 cycle procedure. In each cycle, oligomers are bound to the target molecule, purified by isolating the target to which they
25 are bound, released from the target, and then replicated by 20 to 30 generations of PCR amplification.

Aptamer selection is similar to evolutionary selection of a function in biology. Subjecting the heterogeneous oligonucleotide population to the aptamer selection procedure described above is analogous to subjecting a continuously reproducing
30 biological population to 10 to 20 severe selection events for the function, with each selection separated by 20 to 30 generations of replication.

Heterogeneity is introduced, e.g., only at the beginning of the aptamer selection procedure, and does not occur throughout the replication process. Alternatively, heterogeneity can be introduced at later stages of the aptamer selection procedure.

Various oligomers can be used for aptamer selection, including, e.g., 2'-fluoro-
 5 ribonucleotide oligomers, NH₂-substituted and OCH₃-substituted ribose aptamers, and deoxyribose aptamers. RNA and DNA populations are equally capable of providing aptamers configured to bind to any type of target molecule. Within either population, the selected aptamers occur at a frequency of 10⁹ to 10¹³, see Gold et al., ("Diversity of Oligonucleotide Functions," Annual Review of Biochemistry, 64:763-97, 1995), and most
 10 frequently have nanomolar binding affinities to the target, affinities as strong as those of antibodies to cognate antigens. See Griffiths et al., (EMBO J., 13:3245-60, 1994).

Using 2'-fluoro-ribonucleotide oligomers is likely to increase binding affinities ten to one hundred fold over those obtained with unsubstituted ribo- or deoxyribo-oligonucleotides. See Pagratis et al. ("Potent 2'-amino and 2' fluoro
 15 2'-deoxyribonucleotide RNA inhibitors of keratinocyte growth factor" Nature Biotechnology, 15:68-73). Such modified bases provide additional binding interactions and increase the stability of aptamer secondary structures. These modifications also make the aptamers resistant to nucleases, a significant advantage for real world applications of the system. See Lin et al. ("Modified RNA sequence pools for in vitro
 20 selection" Nucleic Acids Research, 22:5229-34, 1994); Pagratis, *supra*.

In the present invention, aptamers can be used to detect, e.g., mRNAs, cDNAs, or proteins corresponding to CNS marker genes.

In some embodiments of the invention, probes (e.g., nucleic acid probes, antibodies, or aptamers) for the human homologs of CNS genes are used in the detection
 25 method. In other embodiments, the probe used for detection consists of highly conserved regions of a gene, e.g., a sequence that is highly conserved between homologous mouse and human sequence.

Sample Preparation and Analysis

30 In methods of the invention, the transcription level of one or more CNS genes is assumed to be reflected in the amount of its corresponding mRNA present in cells of an

assayed CNS sample. In general, mRNA from the CNS cells or tissue is copied into cDNA under conditions such that the relative amounts of cDNA produced representing specific genes reflect the relative amounts of the mRNA in the sample. Comparative hybridization methods involve comparing the amounts of various, specific mRNAs in two tissue samples, as indicated by the amounts of corresponding cDNAs hybridized to sequences from the genes of interest.

The mRNA used to produce cDNA is generally isolated from other cellular contents and components. One useful approach for mRNA isolation is a two-step approach. In the first step, total RNA is isolated. The second step is based on hybridization of the poly(A) tails of mRNAs to oligo(dT) molecules bound to a solid support, e.g., a chromatographic column or magnetic beads. Total RNA isolation and mRNA isolation are known in the art and can be accomplished, for example, using commercial kits according to the vendor's instructions. Similarly, synthesis of cDNA from isolated mRNA is known in the art and can be accomplished using commercial kits according to the vendor's instructions. Fluorescent labeling of cDNA can be achieved by including a fluorescently labeled deoxynucleotide, e.g., Cy5-dUTP or Cy3-dUTP, in the cDNA synthesis reaction. For guidance concerning isolation of mRNA and synthesis of fluorescently labeled cDNA for analysis on a DNA array, see, e.g., Ross et al., *Nature Genetics* 2000, 24:227-235.

In the invention, conventional techniques for hybridization and washing of DNA arrays, detection of hybridization, and data analysis can be employed routinely without undue experimentation. Commercial vendors of hardware and software for scanning DNA arrays and analyzing data include Cartesian Technologies, Inc. (Irvine, CA); GSI Lumonics (Watertown, MA); Genetic Microsystems Inc. (Woburn, MA); and Scanalytics, Inc. (Fairfax, VA).

In other embodiments, the expression level of one or more CNS genes is reflected in the presence and/or level of protein present in cells of a CNS sample to be assayed. The presence or level of protein in a CNS sample can be detected by routine methods. For example, a CNS sample (e.g., a CSF sample) can be analyzed by gel electrophoresis techniques such as 2-dimensional (2D) PAGE. Once protein spots are separated on a 2D-PAGE gel, differentially expressed spots can be identified, e.g., by matrix assisted laser

desorption ionization time of flight (MALDI-TOF) and electrospray ionization (ESI). This method can also be used for peptide analysis to provide the fingerprint of a particular protein in a sample.

5 A second proteomic approach can involve obtaining a proteomic spectrum by directly analyzing a CNS sample, such as a CSF sample, by mass spectroscopy. For example, surface enhanced laser desorption ionization time of flight (SELDI-TOF) analysis can be performed to generate a proteomic pattern from a CNS sample. SELDI-TOF analysis has been shown to be able to identify a cluster pattern that differentiates between normal and disease patients. See, Paweletz et al., Dis. Markers,
10 17(4):301-7, 2001.

Generating Gene Expression Profiles

A gene expression profile used in the methods described herein is a pattern of expression of two or more CNS genes. In some cases, an expression profile can be a
15 pattern of expression of 5, 10, 25, 50, 100, 200, 500, or more genes. A "reference gene expression profile" as used herein is a characteristic pattern of expression of two or more CNS genes, where the pattern of expression is associated with risk or presence of a particular disorder. The association between the characteristic profile and the particular disorder is determined through the generation and analysis of CNS gene expression data
20 to mine and identify correlations between particular patterns of CNS gene expression (e.g., relative increases and/or decreases of gene expression of particular genes compared to a negative control) and particular clinical states. For example, a reference gene expression profile can be a set of genes (also referred to herein as a "panel" or "cluster" of genes), where each gene of the set is either down-regulated or upregulated when
25 associated with a specific peripheral disorder or any peripheral disorder. A reference profile can also include a value, e.g., a relative value, of gene expression for two or more genes in a panel, where at least one gene of the panel is down-regulated and at least one gene is up-regulated. An example of such a gene expression profile is a profile that includes a value for the relative differential expression of at least 2, e.g., between 2 and
30 50, of the genes shown in any of the tables of FIG. 24A-C or between two and seven of the genes listed in FIG. 26. Such a reference profile is associated with the presence of

early stage carcinoma. Other examples are provided by each of the clusters disclosed in FIGS. 2-26. For example, clusters 9 and 10 of FIG. 13(1-5) each provide a profile or panel of genes that are strongly down-regulated in the cortex in response to the presence of lung cancer.

Exemplary gene expression profiles associated with non-CNS carcinoma (or particular types of non-CNS carcinoma, such as breast, lung or colon carcinoma) are shown in FIGS. 2-26. A reference gene expression profile can include at least a portion of the genes or gene products shown in these figures. For example, a reference gene expression profile associated with lung carcinoma can include a value for the differential expression of 1, 2, 5, 10, 20, 30, 40, 50, or more, genes or gene products listed as CNS markers for lung carcinoma in FIG. 24C. In another example, a reference gene expression profile associated generally with carcinoma can include a value for the differential expression of between one and seven genes or gene products listed as CNS markers for carcinoma in FIG. 26. The reference profiles that can be used with the methods of the invention are not limited by the CNS markers described herein.

Reference profiles can be generated by detecting changes in patterns of gene expression in the CNS in response to the presence of non-CNS disease in an experimental animal, and identifying the human homologs of the genes and gene clusters that are differentially expressed in a certain pattern in the experimental samples, as exemplified in Examples 1-3 described herein. A reference gene expression profile can also be obtained by evaluating human CNS gene expression data. For example, a database can be created and maintained where CNS gene expression data is obtained and stored, e.g., digitally or electronically, for tens, hundreds, or thousands of individuals. The individuals can be followed and evaluated with regard to cancer clinical state longitudinally (e.g., at least 5 years, 10 years, 15 years, 20 years, 30 years, 50 years or a lifetime). The expression profiles of individuals who developed a particular disease, e.g., 5, years, 10 years, 15 years, 20 years, 30 years, or 50 years after the CNS gene expression data was obtained, can be compared with the expression profiles of individuals who remained disease free. Similar comparison can be made between individuals who developed one clinical type of the disorder compared to another, or individuals who developed the disease at an early age versus a late age. These analyses can provide specific reference CNS gene

expression profiles that are associated with different stages of disease, e.g., different stages of neoplasia, or different types of tumors.

A “test gene expression profile” is obtained from a CNS sample of a subject to be tested for the presence of peripheral disease. First, a CNS sample, e.g., a brain cell sample or CSF sample, is obtained from the subject by routine means such as brain needle biopsy (for a brain cell sample) or a lumbar puncture (for CSF), as described herein. The sample is then prepared for use in a method of detecting gene expression, e.g., any method of detecting gene expression described herein. In one embodiment, total RNA can be prepared from the sample, and reverse transcribed into cDNA for use in a nucleic acid array assay described herein. In another embodiment, total protein is prepared from the sample for use in an antibody assay described herein. The prepared sample can then be contacted with an array (e.g., an antibody or nucleic acid array) that can detect expression levels (or protein levels in the case of an antibody array) of at least one cluster or panel of CNS genes or gene products corresponding to the cluster or panel of CNS genes or gene products of one or more particular reference gene expression profiles to which the test sample will be compared. For example, a prepared CNS sample from the test subject can be contacted with a nucleic acid array containing nucleic acid probes or an antibody array containing antibody probes for two or more, e.g., between 2 and 50, between 2 and 100, or between 10 and 500, of the genes shown in FIGS. 2-26. In one embodiment, the array can contain probes for each of the marker genes in a particular cluster disclosed in any of FIGS. 2-26.

The results of the array assay are obtained by routine techniques, such as fluorescence detection and measurement of bound antibody or hybridized nucleic acid for each position (each probe) on the array. A dataset of the values for the level of each polypeptide or gene detected in the CNS sample by each antibody or probe on the array can then be generated. The dataset can contain information such as patient identifier, and actual and/or relative levels of expression or protein detected. Such a dataset can be used directly as the “test gene expression profile” or the dataset can be converted into a format comparable to the format of the reference profile.

Once the test expression profile is generated, a test profile can be compared to a reference expression profile as described herein.

Analyzing Gene Expression Profiles

The invention also features methods of evaluating a subject by comparing a test gene expression profile from a test subject with a reference gene expression profile, e.g., a negative control ("normal") gene expression profile associated with the absence of a particular non-CNS disorder or a positive control gene expression profile associated with the presence of the disorder. Longitudinal studies of CNS gene expression in multiple volunteers can be performed to identify and confirm reference gene expression profiles that are associated with individuals who remain disease free or individuals who get the disease. Such studies can provide the raw data for a database of negative and positive control gene expression profiles that can be used in the present methods.

Subject "test" and "reference" profiles can be obtained by methods described herein. In one embodiment, the method includes obtaining a CNS sample from a subject (either directly or indirectly from a caregiver or other party), creating an expression profile from the sample, and comparing the subject's expression profile to one or more reference profiles and/or selecting a reference profile most similar to that of the subject.

As with other detection methods, profile-based assays can be performed prior to the onset of symptoms (in which case they can be diagnostic), prior to treatment (in which case they can be prognostic) or during the course of treatment (in which case they serve as monitors) (see, e.g., Golub et al., 1999, Science 286:531).

A variety of routine statistical measures can be used to compare two gene expression profiles. One possible metric is the length of the distance vector that is the difference between the two profiles. Each of the test and reference profile is represented as a multi-dimensional vector, wherein each dimension is a value in the profile, e.g., a value for the expression of a particular gene in a panel. A test profile and reference profile can be said to match if they are at least 70% identical in reference to the number of genes having similar expression patterns in each profile, or to the level of expression of the genes in each profile. In one embodiment, a test and reference profile are said to match if their respective multi-dimensional vectors, as described above, have a 30% or lower variance with respect to each other. If the test and reference profile match, the test subject can be identified as having the peripheral disorder with which the reference

profile is associated. If the test and normal profile match, the subject is likely to be free of the peripheral disorder.

In one embodiment, pattern recognition software is used to identify matching profiles. For example, unsupervised clustering algorithms, such as hierarchical
 5 clustering, K-means clustering, and SOM (self-organizing maps) for pattern discovery can be used. Supervised techniques such as SVM (support vector machines) and SPLASH (structural pattern localization analysis by sequential histograms) algorithms implemented in the Genes@Work software package (IBM Corp.) can also be used.

In another embodiment, gene expression profiles are analyzed by quantitative
 10 pattern comparison performed by applying a nearest neighbor classifier (see Jelinek et al., Mol. Cancer Res., 1:346-61, 2003). Based on the nearest neighbor classifier a score is defined which, together with a permutations-derived distribution, can be used to estimate the probability of each test profile of belonging to a class defined by a reference gene expression pattern (see Jelinek, *supra*).

15 The result of the diagnostic test, which can be transmitted to the subject, a caregiver, or another interested party, can be the subject expression profile *per se*, a result of a comparison of the subject expression profile with another profile, a most similar reference profile, or a descriptor of any of these. Transmission can occur across a computer network (*e.g.*, in the form of a computer transmission such as a computer data
 20 signal embedded in a carrier wave). Accordingly, the invention also features a computer medium having executable code for effecting the following steps: receive a subject expression profile; access a database of reference expression profiles; and either i) select a matching reference profile most similar to the subject expression profile, or ii) determine at least one comparison score for the similarity of the subject expression
 25 profile to at least one reference profile. The subject expression profile and the reference expression profile each include a value representing the level of expression of one or more of the identified genes or gene products or the proteins they encode.

Predictive Medicine

30 The methods described herein are generally useful in the field of predictive medicine and, more specifically, are useful in diagnostic and prognostic assays, in

monitoring progression of a disease, e.g., neoplasia, or monitoring of response to treatment, e.g., in clinical trials. For example, one can determine whether a subject has a very early stage neoplasia, in the absence of other, e.g., clinical, indications of neoplasia. In another example, one can determine whether a subject is at risk for developing

5 rheumatoid arthritis or whether the subject has early stage RA, in the absence of clinical indications of RA such as joint inflammation. The methods are particularly useful, e.g., for patients who have had surgery or treatment for the disease (e.g., to remove cancer), in which case the methods could be used to monitor recurrence or metastasis, for persons living in regions of high incidence of cancer due, e.g., to environmental factors, or for

10 individuals who have a family history of a disease (e.g., diabetes, asthma or cancer) or are carriers of a disease susceptibility gene, e.g., a cancer susceptibility gene (e.g., BRCA1 or BRCA2, hMSH2, MLH1, MSH2, or MSH6). Other cancer susceptibility genes are described in The Genetic Basis of Human Cancer, 2nd edition (Vogelstein and Kinzler, Eds.), McGraw-Hill Professional (2002). Such individuals can be evaluated

15 using the methods described herein.

In some cases, for example, where the risk of developing a disease is high (e.g., where an individual has a strong family history of asthma, or where an individual carries a cancer susceptibility gene or lives in a high risk area for cancer), an individual can be evaluated periodically (e.g., every 10 years, every 5 years, or every year) during his

20 lifetime.

The "subject" referred to here, and that is referred to in the context of any of the methods of the invention, is a vertebrate animal, typically a mammal. The subject can be an experimental animal (e.g., an experimental rodent such as a rat or mouse), a domesticated animal (e.g., a dog or cat); an animal kept as livestock (e.g., a pig, cow,

25 sheep, goat, or horse); a non-human primate (e.g., an ape, monkey, or chimpanzee). The animal can be an unborn animal (accordingly, the methods of the invention can be used to carry out genetic screening or to make prenatal diagnoses). Of course, the subject can also be, and typically is, a human.

Computer-Readable Medium

In another aspect, the invention features a computer-readable medium having a plurality of digitally encoded data records. Each data record includes a value representing the level of expression of a CNS gene, and a descriptor of the sample. The descriptor can be, e.g., an identifier (e.g., an identifier for the patient from which the sample was obtained, e.g., a name or a reference code that can be matched with patient information only by those having access to a decoding table), a diagnosis made, or a treatment to be performed in the event the level of expression reaches a certain level or falls below a certain level. The data record can also include values representing the level of expression of related genes (e.g., the data record can include values for each of a plurality of genes in a gene "cluster," where a particular reference profile of gene expression for the genes in the cluster is associated with a peripheral disorder). The data record can also include values for control genes (e.g., genes whose expression is not changed in control samples or whose expression is not diagnostically correlated with a peripheral disorder). The data record can be structured as a table (e.g., a table that is part of a database such as a relational database (e.g., a SQL database of the Oracle or Sybase database environments)).

Non-CNS Diseases

The methods described herein are not limiting in that they can be used to diagnose, monitor, or treat any non-CNS disorder, such as a neoplasia (e.g., tumor or cancer); an immune disorder (e.g., an autoimmune disorder such as rheumatoid arthritis, multiple sclerosis, systemic lupus erythematosus, psoriasis, scleroderma); an allergic or inflammatory disorder (e.g., asthma, inflammatory bowel disease, Crohn's disease); a metabolic or endocrine disorder (e.g., diabetes, obesity, Addison's disease); a pathogenic infection (e.g., a viral, parasitic or fungal infection, e.g., HIV infection); or a cardiovascular disorder.

As used herein, "neoplasia" refers to the uncontrolled and progressive proliferation of cells under conditions that would not elicit, or would cause cessation of, proliferation of normal cells. Neoplasia results in the formation of a "neoplasm," which is defined herein to mean any new and abnormal growth, particularly a new growth of

tissue, in which the growth is uncontrolled and progressive. Neoplasm, as used herein, is synonymous with "tumor." Malignant neoplasms or tumors are distinguished from benign in that the former show a greater degree of anaplasia, or loss of differentiation and orientation of cells, and have the properties of invasion and metastasis. Thus, neoplasia
 5 includes "cancer," which herein refers to a proliferation of cells having the unique trait of loss of normal controls, resulting in unregulated growth, lack of differentiation, local tissue invasion, and metastasis. The methods described herein can be used to diagnose neoplasia from any non-CNS cell or tissue type, such as neoplasia derived from epithelial or endocrine tissue, mesenchymal tissues, or hematopoietic tissue.

10 The term "carcinoma" is art recognized and refers to malignancies of epithelial or endocrine tissues including respiratory system carcinomas, gastrointestinal system carcinomas, genitourinary system carcinomas, testicular carcinomas, breast carcinomas, prostatic carcinomas, endocrine system carcinomas, and melanomas. Exemplary carcinomas include those forming from tissue of the colon, lung, prostate, breast, cervix,
 15 head and neck, and ovary. The term also includes carcinosarcomas, which include malignant tumors composed of carcinomatous and sarcomatous tissues. An "adenocarcinoma" refers to a carcinoma derived from glandular tissue or in which the tumor cells form recognizable glandular structures.

20 The term "sarcoma" is art recognized and refers to malignant tumors of mesenchymal derivation.

As used herein, the term "hematopoietic neoplastic disorders" includes diseases involving hyperplastic/neoplastic cells of hematopoietic origin, e.g., arising from myeloid, lymphoid or erythroid lineages, or precursor cells thereof. The disorders can arise from poorly differentiated acute leukemias, e.g., erythroblastic leukemia and acute
 25 megakaryoblastic leukemia. Exemplary myeloid disorders include, but are not limited to, acute promyeloid leukemia (APML), acute myelogenous leukemia (AML) and chronic myelogenous leukemia (CML) (reviewed in Vaickus, L. (1991) Crit Rev. in Oncol./Hematol. 11:267-97); lymphoid malignancies include, but are not limited to acute lymphoblastic leukemia (ALL) which includes B-lineage ALL and T-lineage ALL,
 30 chronic lymphocytic leukemia (CLL), prolymphocytic leukemia (PLL), hairy cell leukemia (HLL) and Waldenstrom's macroglobulinemia (WM). Additional forms of

malignant lymphomas include, but are not limited to non-Hodgkin lymphoma and variants thereof, peripheral T cell lymphomas, adult T cell leukemia/lymphoma (ATL), cutaneous T-cell lymphoma (CTCL), large granular lymphocytic leukemia (LGF), Hodgkin's disease and Reed-Sternberg disease.

5

Identification Of CNS Marker Genes for Non-CNS Disorders

Also featured in the invention are methods of identifying a CNS diagnostic marker for a non-CNS disorder in a subject. Generally, such methods involve detecting changes in gene expression in the CNS in response to the presence of a particular non-
 10 CNS disease condition in a subject, e.g., an experimental animal. The methods will generally involve inducing a disease condition or disorder in a test experimental animal; and comparing the expression of at least one gene in a CNS sample from the test experimental animal to expression of the gene in a CNS sample from a control experimental animal. A gene (or a human homolog of a gene) that is differentially
 15 expressed in the CNS sample from the test experimental animal compared to the CNS sample from the control experimental animal can be identified as a CNS diagnostic marker for a non-CNS disorder. Such markers are referred to herein as CNS "marker genes" or "disease surveillance genes" for non-CNS disease. It is understood, however, that the gene product of the marker gene can also serve as a diagnostic marker. In most
 20 cases, a plurality of differentially expressed markers are identified (e.g., a "profile" or "cluster" of markers is identified). The experimental animal is preferably an experimental mammal, and can be, e.g., an experimental rodent (e.g., a rat, mouse or guinea pig) or non-human primate (e.g., an ape, e.g., a monkey or chimpanzee).

The methods of detection of gene expression described herein, and particularly
 25 array and chip technology, are useful for methods of identifying CNS marker genes for non-CNS neoplasia. CNS samples are prepared from experimental and control animals (e.g., brains are biopsied or removed, or CSF samples are taken) and RNA, cDNA or protein is prepared from the samples as described herein. A single chip (e.g., a commercially available chip having probes for a large number of genes in the genome of
 30 the experimental animal species) can allow measurement of the level at which hundreds, thousands, or even tens of thousands of genes are expressed in the CNS sample of a test

experimental animal compared to a control experimental animal. Typically, clustering methodology or other bioinformatics tools are used to mine the data obtained from such large scale experiments and identify the genes or clusters of genes that are statistically significantly differentially expressed in an experimental sample compared to a control sample. Many such tools and programs are available to the skilled artisan. An exemplary method of data analysis is described herein and exemplified in the Examples below.

CNS Marker Genes for Neoplasia

In one embodiment, identifying a CNS diagnostic marker for a non-CNS neoplastic disorder involves detecting changes in gene expression in the CNS in response to the presence of a non-CNS neoplasm in an experimental animal. For example, a neoplasm is induced in an experimental animal and gene expression in the CNS of the experimental animal is evaluated compared to a control animal. Methods for inducing growth of a non-CNS neoplasm, e.g., a cancer, in an experimental animal, are known in the art and include, e.g., chemical or radiation mutagenesis, or transplantation of a neoplastic cell (e.g., a neoplastic cultured cell or cell line) to the experimental animal. CNS genes or gene products whose expression is altered in the experimental animal compared to a control animal are identified as CNS markers or surveillance genes for neoplasia. Examples of CNS marker genes for cancer, particularly for carcinoma, are provided herein by FIGS. 2-26 and Examples 1-3.

CNS Marker Genes for Rheumatoid Arthritis

In another embodiment, identifying a CNS diagnostic marker for rheumatoid arthritis (RA) involves detecting changes in gene expression in the CNS in an animal model of RA compared to a wild type animal. For example, the art-recognized rodent collagen induced arthritis (CIA) model can be used. In this model, arthritis is induced in a rodent, e.g., a DBA /1 mouse, by intradermal injection of purified collagen. 100 µg of purified type II collagen emulsified in complete adjuvant is typically injected at the base of the tail. Onset of arthritis is macroscopically visible as paw swelling or redness approximately three weeks after immunization (Williams et al., 1992, Proc. Natl. Acad. Sci. (USA), 89:9784-9788). Clinical features of arthritis are monitored by quantitatively

assessing paw swelling (e.g., with calipers) over a period of time. Severity of arthritis is assessed according to established clinical scores (Williams et al., 1995, *Eur. J. Immunol.*, 25:763-769). CNS genes or gene products whose expression is altered in the CIA animal compared to a control animal are identified as CNS markers or surveillance genes for RA.

Given the involvement of Th1 lymphocytes and B cells, proinflammatory cytokines, and a possible mimicry of bacterial LPS in disease involvement, it is likely that genes that regulate these processes are candidates to be involved in early RA surveillance in the CNS. For example, proinflammatory cytokines produced in the brain such as

IL-1 β , TNF, IL-18, IFN- γ , IL-12, gp130; cytokines such as IL-6 and leukemia inhibitory factor (LIF); neurotransmitters and neurotrophic factors such as N-methyl-D-aspartate (NMDA), brain-derived neurotrophic factor (BDNF), glial cell line-derived neurotrophic factor (GDNF), nerve growth factor (NGF); inhibitors of cytokines such as prostaglandin E2 (PGE2) and SOCS-1 and -3; SOCS regulators such as cAMP-inducing central peptides; brain molecules that are produced as a result of cytokine action, such as pentraxin 3 (PTX3); hormone releasing factors such as corticotropin; corticotropin-releasing hormone (CRH) and other hormones involved in the regulation of the HPA axis; pituitary corticotroph proteins such as POMC; molecules involved in NF- κ B-mediated signaling of inflammatory response; and other members of the families of these genes, as well as inducers and stimulators of these proteins, may be disease-surveillance genes for RA. See, e.g., Blond et al., 2002, *Brain Res.*, 958(1):89-99; Suk et al., 2001, *Immunol. Lett.*, 77(2):79-85; Losy et al., 2001, *Acta Neurol. Scand.*, 104(3):171-3; Opp et al., 2001, *Neuroendocrinology*, 73(4):272-84; Chesnokova et al., 2002, *Endocrinology*, 143(5):1571-4; Bousquet et al., 2002, *Mol. Endocrinol.*, 15(11):1880-90; Polentarutti et al., 2000, *J. Neuroimmunol.*, 106(1-2):87-94; Bayas et al., 2003, *Neurosci. Lett.* 335(3):155-8; Xu et al., 2000, *Acta Pharmacol. Sin.* 21(7):600-4; Fang et al., 2000, *Neuroreport*, 11(4):737-41).

CNS Marker Genes for Asthma

In another embodiment, identifying a CNS diagnostic marker for asthma involves detecting changes in gene expression in the CNS in an animal model of asthma compared

to a wild type animal. Several experimental models of asthma are known in the art, including rodent, sheep, and non-human primate models (for a review, see Isenberg-Feig et al., 2003, Curr. Allergy Asthma Rep. 3(1):70-8). Any of these can be used in the present methods. In one embodiment, the experimental model of asthma is performed according to Komai et al. (2003, Br. J. Pharmacol., 138(5):912-20). In brief, Balb/c mice are sensitized by intraperitoneal administration of 50 µg of ovalbumin combined with 1 mg of alum (Al(OH)₃) on day 0 and 12. From day 22 to 43 animals are exposed to daily aerosol challenges of 1% w/v of ovalbumin for 30 minutes. Control animals can include saline-injected animals and animals sensitized with ovalbumin and alum and challenged with saline. Airway function is evaluated by measuring one or more of: airway responsiveness to acetylcholine; IL-4, IL-5, and/or IL-13 levels; interferon-γ levels; eosinophil numbers in bronchoalveolar fluids; specific IgG1 and IgG2a levels in sera; lung histology; and rectal temperature. CNS markers or surveillance genes for asthma are those whose expression is altered in the asthma model animal compared to a control animal, or those whose expression is altered after aerosol challenge compared to before aerosol challenge.

Several gene products associated with the CNS have been shown to influence the Th-2 response and are candidates as disease-surveillance genes. These include glucocorticoid, one of the main hormonal mediators of stress, which acts on antigen-presenting cells to suppress the production of IL-12 *in vitro* and *ex vivo*; neurotransmitters norepinephrine or epinephrine; β-adrenoreceptor (ARs) agonists and antagonists (e.g., propranolol); modulators of neurotransmission such as adenosine and adenosine analogues; opiod system components, which influence the immunological response in general and the Th-1/Th-2 balance in particular; mediators of allergic reactions, such as histamine; neuropeptides such as substance P, vasoactive intestinal peptide and somatostatin, which increase the release of histamine from mast cells. See Blotta et al., 1997, J. Immunol. 158: 5589-5595; Elenkov et al., 1996, Proc. Assoc. Am. Physicians, 108: 374-381; Cooper et al., The biochemical basis of Neuropharmacology, Oxford University Press, 1996, p. 123; Link et al., 1999, J. Immunol. 164: 436-442; Loizzo et al., 2002, Br. J. Pharmacol., 135(5):1219-26; Lowman et al., 1988, British

Journal of Pharmacology, Vol 95:121-130; and Elenkov et al., Annals of the New York Academy of Sciences, 2000, 917:94-105.

CNS Marker Genes for Diabetes

5 In another embodiment, identifying a CNS diagnostic marker for diabetes involves detecting changes in gene expression in the CNS in an animal model of diabetes compared to a wild type animal. Several experimental models of diabetes are known in the art, e.g., spontaneous models such as the NOD Mouse and BB Rat, and inducible models such as streptozotocin-induced (STZ) Diabetic Rats. These are reviewed in
10 Cheta, 1998, J. Pediatr. Endocrinol. Metab., 11(1):11-9. CNS markers or surveillance genes for diabetes are those whose expression is identified to be altered in an induced animal compared to an uninduced animal (e.g., a streptozotocin-fed STZ rat compared to a control fed STZ rat), or those whose expression is altered in the early stages of spontaneous progression of disease.

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CNS Marker Genes for Obesity

In yet another embodiment, identifying a CNS diagnostic marker for propensity for obesity involves detecting changes in gene expression in the CNS in an animal model of obesity, e.g., comparing CNS gene expression in an obesity-prone animal before and
20 after obesity develops or is clinically detectable. The method can involve comparing differences in CNS gene expression between mouse strains that are either prone to obesity or resistant to obesity after being exposed to a fat-rich diet. For example, the method can employ the C57BL/KsJ(KsJ) or A/J strain of mice, both of which are resistant to the development of dietary obesity, or the obesity-prone strain C57BL/6J
25 (B6).

Possible disease-surveillance genes for obesity or loss or body weight control include leptin, leptin receptor, ghrelin, cholecystokinin (CCK), CCK-A receptor, neuropeptide Y (NPY), proopiomelanocortin (POMC), α -melanocyte stimulating hormone (α -MSH), and other molecules that participate in the central control of energy
30 balance. Given the fact that so many gene products orchestrate behaviors related to food intake, genetic deficiencies or the presence of particular polymorphic alleles in one or

more of these genes may induce disorders in the control of energy homeostasis leading to obesity. Such a deficiency or disruption in the normal signaling of such molecules can likely trigger an early signal that alters CNS gene expression.

5 Isolating Homologous Sequences from Other Species

The human homologs of CNS marker genes and their products (e.g., human homologs of CNS marker genes identified by experiments in non-human experimental animals) are useful for various embodiments of the methods described herein. Human homologs are known for most of the CNS marker genes provided herein. In those cases
 10 where a human homolog is not identified, several approaches can be used to identify such genes. These methods include low stringency hybridization screens of human libraries with a mouse marker gene nucleic acid sequence, polymerase chain reactions (PCR) of human DNA sequence primed with degenerate oligonucleotides derived from a mouse marker gene, two-hybrid screens, and database screens for homologous sequences.

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Therapeutic Methods

The methods described herein can identify or diagnose the presence of a non-CNS disorder in a subject at an early stage in the pathogenic process. As such, the methods allow for early intervention, which can be the key to successful treatment and/or
 20 management of many disorders. For example, if a propensity for obesity or diabetes can be diagnosed at an early stage using the methods described herein, simple lifestyle or nutritional changes may be sufficient to stop or slow the progress of the disease, where such changes would not be sufficient if the disease were diagnosed at a later, more progressive stage. Similarly, a neoplasia that is detected at an early stage is more likely
 25 to be treated with less toxic therapeutic agents, or lower doses of a therapeutic agent, than would be used at a stage of advanced neoplasia, e.g., cancer.

Chemotherapeutic Agents

In one embodiment, the methods described herein can identify or diagnose the
 30 presence of a non-CNS neoplasia in a subject at an early stage, e.g., before a neoplasm has formed, before a neoplasm is clinically detectable, and/or before a tumor has become

malignant. As such, a neoplasm detected by a method described herein is amenable to treatment by an agent that targets neoplastic cells in general or targets specific neoplastic cells in particular. In one embodiment, a subject may be treated with a chemotherapeutic agent. Chemotherapeutic agents, as used herein, refer to chemical therapeutic agents or drugs used in the treatment of neoplasia. This term is used for simplicity notwithstanding the fact that other compounds may be technically described as chemotherapeutic agents in that they exert an anti-cancer effect. A number of exemplary chemotherapeutic agents are described below.

Suitable chemotherapeutic agents include: antitubulin/antimicrotubule drugs, e.g., paclitaxel, taxol, tamoxifen, vincristine, vinblastine, vindesine, vinorelbin, taxotere; topoisomerase I inhibitors, e.g., topotecan, camptothecin, doxorubicin, etoposide, mitoxantrone, daunorubicin, idarubicin, teniposide, amsacrine, epirubicin, merbarone, piroxantrone hydrochloride; antimetabolites, e.g., 5-fluorouracil (5-FU), methotrexate, 6-mercaptopurine, 6-thioguanine, fludarabine phosphate, cytarabine/Ara-C, trimetrexate, gemcitabine, acivicin, alanosine, pyrazofurin, N-Phosphoracetyl-L-Aspartate=PALA, pentostatin, 5-azacitidine, 5-Aza 2'-deoxycytidine, ara-A, cladribine, 5 - fluorouridine, FUDR, tiazofurin, N-[5-[N-(3,4-dihydro-2-methyl-4-oxoquinazolin-6-ylmethyl)-N-methylamino]-2-thenoyl]-L-glutamic acid; alkylating agents, e.g., cisplatin, carboplatin, mitomycin C, BCNU=Carmustine, melphalan, thiotepa, busulfan, chlorambucil, plicamycin, dacarbazine, ifosfamide phosphate, cyclophosphamide, nitrogen mustard, uracil mustard, and pipobroman, 4-ipomeanol; estrogen modulators, e.g., raloxifene; piroxicam; 9-cis retinoic acid.

Suitable dosages for the selected chemotherapeutic agent are known to those of skill in the art. For example, where the agent is doxorubicin, suitable dosage may include 30 mg/m² of patient skin surface area, administered intravenously, twice at 1 week intervals. However, one of skill in the art can readily adjust the route of administration, the number of doses received, the timing of the doses, and the dosage amount, as needed. Bearing in mind these considerations, generally, a suitable dose for a given chemotherapeutic agent is between 10 mg/m² to about 500 mg/m², and more preferably, between 50 mg/m² to about 250 mg/m² of patient skin surface area (the skin surface of an average sized adult human is about 1.8 m²). Such a dose, which may be readily adjusted

depending upon the particular drug or agent selected, may be administered by any suitable route, including, e.g., intravenously, intradermally, by direct site injection, intraperitoneally, intranasally, or the like. Doses may be repeated as needed.

In one embodiment, because a method described herein can identify or diagnose the presence of a non-CNS neoplasia in a subject at an early stage, e.g., before a neoplasm has formed, before a neoplasm is clinically detectable, and/or before a tumor has become malignant, the dose of a chemotherapeutic agent may be lower than that typically used after a neoplasm, e.g., a cancer, is detected or diagnosed by clinical methods, such as visualization or palpation of a tumor mass.

Therapeutic Targets

A CNS marker gene for a non-CNS disorder, e.g., a CNS marker gene described herein, may not only “sense” the presence of the disorder, but also actively participate in responding to the presence of the disorder by generating a response, e.g., an antitumor response. Alternatively, a CNS marker gene may respond to the presence of non-CNS disorder by promoting progression of the disorder, e.g., inducing growth of a neoplasm or promoting malignant transformation of a neoplasm. As a therapeutic strategy, one would want to promote the expression or activity of the former type of gene, and/or inhibit the expression or activity of the latter type of gene, in the CNS. Thus, regardless of whether a CNS marker gene generates a response to curb or promote a specific disorder, its identification can provide a target for inhibiting progression of the disorder.

One way to identify such CNS marker genes that are also potential therapeutic targets is to identify CNS genes that are differentially expressed in animals that exhibit an inhibitory response against a disease compared to animals that do not exhibit an inhibitory response. For example, experimental animals can be injected with tumor inducing cells (e.g., colon cancer cells such as CT26) that express an interleukin (IL), e.g., IL-12. Injection of tumor cells genetically modified to express IL-12 is known to induce Th1 immune mediated tumor rejection (Adris et al., 2000, Cancer Res., 60(23):6696-703). Control mice can be injected with tumor cells that do not express IL-12. At different times after injection, gene expression in the CNS is analyzed in the animals, as described herein, e.g., by microarray analysis. Thus, genes that “turn off” and

“turn on” specifically in the CNS (e.g., brain) of the animals can be identified. Some of these genes will respond to the presence of the IL. Others will correspond to genes actively engaged in the “stimulation” of the antitumor immune response. This strategy can be used for any interleukin gene that may be involved in the stimulation of an antitumor immune response. Identification of brain genes actively involved in “stimulating” an antitumor response will provide a target for therapeutic intervention, e.g., by direct use of the gene or its gene product, or by screening for agents that block or stimulate their activity.

A second strategy for identifying CNS genes that are potential therapeutic targets is by using transgenic animals (e.g., knockout mice) having brain specific disruptions (e.g., knockouts) in specific genes. A great number of CNS-specific knockout mice are currently available to the skilled artisan (see, e.g., the Jackson Laboratory web site, describing numerous JAX® mice models used in neurobiology), and many more can be expected to become routinely available. A role in the CNS response to non-CNS disease can be established for any particular gene for which a brain knockout animal can be obtained or produced, by inducing the disorder in the knockout mice (e.g., as described herein for cancer, RA, asthma or obesity), and evaluating disease outcome.

CNS marker genes and gene products that are also potential therapeutic targets are listed in FIG. 25A-E. These genes are or encode molecules involved in cell signaling, (e.g., growth factors, hormones, cytokines and their receptors) and are also differentially expressed markers in each of the tumors studied.

Vaccines

The methods described herein also provide targets for preventive vaccination. A set of brain genes that “senses” a disease may include receptors for known or unknown ligands. A disease cell might produce these ligands to inhibit the induction of a brain-derived anti-disease response. In such an instance, identifying a CNS gene that is involved in an anti-disease response can lead to the identification of a gene product secreted by the diseased cell that might impact in the brain to inhibit disease response. A genetic vaccine targeting these products could be a viable therapeutic strategy.

One approach to identify CNS targets for preventive vaccination in the treatment of non-CNS disorders is the following: obtain a CNS gene expression profile (using techniques such as those described herein above) from animals that exhibit an anti-disease response, e.g., in the case of a tumor, an IL-12 mediated antitumor response, in an experimental tumor model. It is expected that from the cluster of genes “sensing” the tumor, some will change their expression levels in the presence of IL-12. This subset of genes will likely be those involved in “generating” the antitumor response. This subset of genes is likely to have predictable modulators. For example, if a CNS gene that changes its expression profile in response to a non-CNS gene in the presence of IL-12 is a receptor, one could predict that the change in gene expression of such a receptor could be brought about by its ligand. Thus, a preventive genetic vaccine could be designed to generate a memory response to such a ligand.

A second experimental approach can involve identifying those CNS genes that change their activity in response to a non-tumorigenic dose of tumor cells (e.g., a condition where neoplasia exists in the body, but no neoplasm is yet formed). From this subset of CNS genes one can predict the modulating genes responsible for their changes in activity, as explained above. Such modulating genes, which may be derived from the neoplastic cells, are likely to be initial tumor-derived signals of alarm in the peripheral body. Thus, a preventive genetic vaccine could be designed to generate a memory response to such genes.

A vaccine can be, e.g., a polypeptide or nucleic acid corresponding to the gene to be targeted. Vaccines described herein can be administered, or inoculated, to an individual in physiologically compatible solution such as water, saline, Tris-EDTA (TE) buffer, or in phosphate buffered saline (PBS). They can also be administered in the presence of substances (e.g., facilitating agents and adjuvants) that have the capability of promoting uptake or recruiting immune system cells to the site of inoculation. Vaccines have many modes and routes of administration. They can be administered intradermally (ID), intramuscularly (IM), and by either route, they can be administered by needle injection, gene gun, or needleless jet injection (e.g., Biojector™, Bioject Inc., Portland, OR). Other modes of administration include oral, intravenous, intraperitoneal, intrapulmonary, intravitreal, and subcutaneous inoculation. Topical inoculation is also

possible, and can be referred to as mucosal vaccination. These include, for example, intranasal, ocular, oral, vaginal, or rectal topical routes. Delivery by these topical routes can be by nose drops, eye drops, inhalants, suppositories, or microspheres.

The following examples are illustrative only and not intended to be limiting.

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EXAMPLES

Example 1: CNS Gene Expression Profiles Associated With Colon Carcinoma

CNS gene expression profiles associated with the presence of a peripheral tumor were identified using gene expression microarray analysis on brain tissue from experimental animals implanted peripherally with tumor cells. This example describes the identification of brain gene expression profiles associated with colon carcinoma.

Male BALB-C mice were injected subcutaneously with 5×10^5 CT-26 WT cells, a murine colon carcinoma cell line (ATCC cat # : CRL-2638), resuspended in 300 μ l of PBS, as described below. Control mice were injected with the corresponding volume of PBS following the same procedure. After a specified time, the animals were sacrificed, their brains dissected, and first strand cDNA was synthesized from total polyA⁺ RNA prepared from different brain regions, as described in detail below. Gene expression microarray analysis was performed with the first strand cDNA by hybridizing to preprinted slides (Corning's CMT-GAP™ II Coated Slides) containing Pan® Mouse 10K Oligo set A (MWG Biotech). This slide set contains probes for 10,000 genes selected from mouse genes that have been functionally defined.

The data from the microarray experiments was analyzed with a Virtek® ChipReader® laser scanner model A0-B0-05 (Virtek Vision Corp, Waterloo, ON, Canada) using the Virtek ChipReader v2.0 software, as described in more detail below.

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Experimental Methodology

Cell Lines: The experimental work was based on the following murine cell lines: CT26WT colon carcinoma (ATCC cat # : CRL-2638), LL/2(LLC1) lung carcinoma (ATCC cat # : CRL-1642) and 4T1 breast carcinoma (ATCC cat # : CRL-2539). All cell lines were grown in P-100 plates with 10 ml of the corresponding medium. All culture media were sterilized by filtration using 0.22 μ m CA filter. CT-26 cells were grown in

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DMEM containing 1.5 g/L Sodium Bicarbonate, 10 mM Hepes, and 1 mM Sodium pyruvate, supplemented with 10% Fetal Bovine Serum at 37°C with 5% CO₂.

LL/2(LLC1) cells were grown in DMEM containing 4.5 g/L Glucose, 1.5 g/L Sodium Bicarbonate, 10 mM Hepes, and 1 mM Sodium pyruvate, supplemented with 10% Fetal Bovine Serum at 37°C with 5% CO₂. 4T1 cells were grown in RPMI 1640 containing 4.5 g/L Glucose, 1.5 g/L Sodium Bicarbonate, 10 mM Hepes, and 1 mM Sodium pyruvate, supplemented with 10% Fetal Bovine Serum at 37°C with 5% CO₂.

In vivo studies: Six week-old animals were housed in an Hepa filtered air rack, 5 animals per cage (both tumor and control animals in the same cage) with food and water ad libitum. Balb-C males were injected subcutaneously with 5×10^5 CT-26 WT cells resuspended in 300 µl of PBS. BALB-C female mice were injected subcutaneously with 1×10^5 4T-1 cells resuspended in 100 µl of PBS. C-57/BL6 male were injected subcutaneously with 1×10^6 LL/2(LLC1) cells resuspended in 300 µl of PBS. Control animals were injected with the corresponding volume of PBS following the same procedure.

For each tumor type 2 different experiments were performed and 3 time points evaluated in duplicate. Each single time point corresponded to 15 mice. All injections were done using a 27-G syringe. At the corresponding time, mice were killed by cervical dislocation. Mice were immediately decapitated, the brain extracted and dissected using the following procedure: the hypothalamus and the cerebellum were dissected, the brain was cut with a surgical razor blade leaving the right and left hemispheres separated, and two persons dissected the midbrain, the hippocampus, the prefrontal cortex and the striatum from each brain hemisphere. All brain regions were immediately frozen in dry ice and stored at -80°C until RNA extraction.

Preparation of Poly A+ RNA: Poly A+ RNA was obtained from total RNA using the MicroPoly(A) Pure® kit from Ambion. In general, starting material was 400 µg total RNA to which a volume of 5M NaCl was added up to a final concentration of 0.45 M NaCl. After mixing, samples were transferred to an RNase-free microfuge tube. After adding binding buffer provided by the manufacturer, the RNA was heated for 5 minutes at 65°C and immediately chilled on ice for 1 minute. Oligo (dT) Cellulose was added to the sample, mixed by inversion and incubated for 60 minutes at room temperature with

gentle agitation. This was followed by centrifugation at 4,000 rcf for 3 minutes. After the supernatant was removed, the pellet was treated with 1 ml binding buffer, mixed and spun down by centrifuging at 4,000 rcf for 3 minutes. After removing the supernatant, the pellet was washed 3 times with binding buffer followed by 4 washes with wash
 5 buffer. The Oligo(dT) Cellulose was then dissolved in 400 µl of wash buffer provided by the manufacturer and transferred to a spin column when the resin was washed 4 more times. When the flow-through of the column reached an absorbance of <0.05 OD at A260, the mRNA was eluted from the Oligo(dT) Cellulose with 200 µl of Elution Buffer (provided by the manufacturer) pre-warmed at 65°C. The eluted polyA+ RNA was
 10 concentrated with a mixture containing 20 µl of 5 M Ammonium Acetate, 1 µl Glycogen and 550 µl of 100% ethanol. After overnight precipitation at -20°C samples were centrifuged at 14,000 rcf for 20 minutes at 4°C. After careful removal of the supernatant the pellet containing the polyA+ RNA was resuspended in 10 µl of DEPC treated Water/EDTA.

15 Labeling of probes for microarray hybridization: Labeling was performed by two indirect methods. The first method used aminoallyl labeled nucleotides via first strand cDNA synthesis using SuperScript Reverse Transcriptase followed by coupling of the aminoallyl to either Cyanine 3 or 5 (Cy3/Cy5) fluorescent molecules (Amersham Pharmacia). To 3 µg of poly(A+) RNA were added 0.6 µl Random Primers (pd (N)6,
 20 Invitrogen) (3 µg/µl) and 1.2 µl Oligo (dT)12-18 (0.5 µg/µl). Milli-Q H₂O was added up to a final volume of 15.5 µl. The mixture was heated at 65°C for 5 min, chilled on ice and spun down. 12.5 µl of a Master Mix containing: 6 µl of 5X First Strand Buffer, 3 µl of 100 mM DTT, 0.6 µl of 50X aminoallyl (Sigma Co)-dNTP mix (Amersham Pharmacia), 1.5 µl of Rnase OUT (40 units/µl, Invitrogen), 1.4 µl Milli-Q H₂O were
 25 added to each tube, incubated at 37°C for 2 minutes, followed by the addition of 2 µl of SuperScript II RT (Invitrogen). After incubation for 2 hr at 37°C tubes were transferred 15 min at 70°C. At the end, tubes were spun down. RNA was degraded by the sequential addition of 3 µl 2.5 M NaOH incubated at 37°C for 15 min, then 15 µl of 2 M HEPES free acid, 4.8 µl 3 M NaAcO (pH 5.2) and finally 150 µl of 100% EtOH. After mixing,
 30 tubes were incubated at -20°C for 1 hr. Tubes were centrifuged for 30 min at 4°C, the supernatant was removed and the pellet was washed twice in 70% ethanol. The pellet

was dissolved in 2.25 μ l Milli-Q H₂O. Coupling of fluorescent Cy3 and Cy5 was performed by initially adding 2.25 μ l of 0.2 M NaHCO₃ (pH 9.0) and then 4.5 μ l of the DMSO/dye mixture to the 4.5 μ l cDNA sample. Tubes were mixed well and incubated for 1 hr at room temperature in the dark. For probe purification 500 μ l of Loading Buffer were added to the sample and mixed. A SNAP Column (Invitrogen) was placed on a collection tube and the sample loaded on the column and incubated at room temperature for 2-5 min. The system was centrifuged at maximum speed for 1 min and the flow-through was discarded. After two more washes the SNAP column was put back in the collection tube and centrifuged at maximum speed for 30 sec to remove residual Wash Buffer from the membrane filter. cDNA was eluted by adding 60 μ l TE buffer to the SNAP column, incubated for 2-5 and centrifuged at maximum speed at room temperature for 1-2 min. After saving the first eluate, the elution was repeated and both samples were combined.

Alternatively, labeling of poly A⁺ RNA was performed with a Clontech kit following manufacturer instructions. Briefly, to 3 μ g of poly(A⁺) RNA were added 0.6 μ l Random Primers (pd(N)₆) (3 μ g/ μ l), 0.5 μ l Oligo(dT)₁₂₋₁₈ (0.5 μ g/ μ l), and deionized H₂O up to 25 μ l. After heating at 70°C for 5 min the tubes were placed at 37°C, and then 25 μ l of Master Mix were added (10 μ l of 5X cDNA Synthesis Buffer, 5 μ l of 10X dNTP Mix, 7.5 μ l H₂O and 2.5 μ l MMLV Reverse Transcriptase (200 units/ μ l). Tubes were incubated at 37°C for 1 hr, followed by 5 min at 70°C. After few minutes at 37°C, RNA was eliminated by adding 0.5 μ l RNase H for 15 min at 37°C and then 0.5 μ l of 0.5 M EDTA (pH 8.0) together with 5 μ l of QuickClean resin. After inserting a 0.45- μ m Spin Filter into the collection tube, the sample was transferred into the Spin Filter. The cDNA was concentrated with 3M Sodium Acetate, the addition of ice-cold 100% ethanol and centrifugation at maximal speed for 20 min at 4°C. The pellet was washed once in 70% ethanol, air dried and dissolved in 10 μ l 2X Fluorescent Labeling Buffer. Fluorescent dye coupling was performed by adding 10 μ l of the DMSO/dye mixture to 10 μ l of the cDNA sample. This mixture was mixed well and incubated for 30 min in the dark. 2 μ l of 3M Sodium Acetate and 50 μ l of 100% ethanol were added. After 2 hr at -20°C the tube was centrifuged for 20 min. After washing the

pellet once in 70% ethanol the pellet was dissolved in 100 μ l H₂O. Probes were purified on NucleoSpin columns.

Quantification of the levels of incorporation of dyes and total DNA: The extent of dye incorporated was obtained by the absorbance at 550 nm and 650 nm for Cy3- and Cy5-probes, respectively. The amount of DNA was obtained by the absorbance at 260 nm. At the end of the entire procedure the amount of total DNA obtained was 0.34-0.65 μ g DNA / 1 μ g poly A+ RNA for the Clontech procedure and 0.8 – 1.2 μ g DNA / 1 μ g poly A+ RNA for the SuperScript and indirect labeling procedure. The current percentage of dye incorporation was 5 – 15 % in the first case and 7.5 – 20 % in the second.

Microarrays and Data Analysis

Prehybridization: The Prehybridization Buffer (5 ml of 20X SSC Buffer, 0.25 ml of 20% SDS, 5 ml of 10% BSA and 24.75 ml of Milli-Q H₂O) was preheated at 42°C.

The printed slide was put in a 50 ml-Falcon polypropylene tube containing the preheated prehybridization buffer and incubated at 42°C for 40 min. After washing five times, 1 min each, with Milli-Q H₂O preheated at 42°C in a Wash Station, slides were washed four or five times in 2-propanol. The slide was dried by centrifugation for 1 min using a Microarray Centrifuge. Cover glasses were washed with Milli-Q H₂O and 2-propanol and dried. Slides were used immediately for hybridization.

Probe preparation: 2 μ g of probe (1 μ g Cy3- + 1 μ g Cy5-labeled probes) were used per slide. This amount represents 100-110 pmoles and 70-80 pmoles of Cy3 and Cy5 incorporated dye, respectively. If dye incorporation levels were below that value, the amount of nucleotide was increased to reach these values (picomoles of labeled probe). Probe was concentrated by speedvac to about 20 μ l, combined and mixed well.

Hybridization: Each hybridization mix contained: 20 μ l of 4 X Hybridization Buffer (Amersham Pharmacia; Cat. No. RPK0325), 24 μ l of formamide (final concentration, 30 %) and 16 μ l of Salmon Sperm DNA (final concentration 1 μ g / μ l). This master mix was added to probes, mixed well, heated at 95°C for 3 min, snap cooled on ice for 1 min and centrifuged at 16.000 x g for 1 min. A pre-hybridized microarray slide (array side up) was placed in a hybridization chamber. Two Parafilm strips were put

at both sides of the array printed area. Finally, the probe was placed carefully on the top of the slide surface followed by the coverslip on top of it (FIG. 1). 10 µl of Milli-Q H₂O (20 µl total) was added to the small wells at each end of the chamber to seal the chamber. Slides were incubated at 42°C for 16-20 hours under gently mixing in a 3D-rotator. At the end of the hybridization, the slide was carefully removed and washed with washing buffer preheated at 42°C for 5 min with agitation (2 X SSC, 0.1 % SDS). Slides were washed twice more in different chambers, each time for 5 minutes (First in 1 X SSC and then in 0.1 X SSC). The slide was dried by centrifugation for 1 min in a microarray centrifuge and placed in a light tight slide box until scanning.

Data acquisition and image processing: The slides were scanned with a Virtek ChipReader laser scanner model A0-B0-05 (Virtek Vision Corp, Waterloo, ON, Canada) using the Virtek ChipReader v2.0 software. Three images were obtained for each of the Cy3 and Cy5 channels with different detector sensitivity values for each slide, with a resolution of 10 µm and a pixel depth of 16 bits. The images were stored as 16 bit TIFF files (Tagged Image File Format) and analyzed with Virtek ChipReader v2.0 software. The results were stored in plain text files with the following fields separated by tabulations: GridName, Column#, Row#, CentroidX, CentroidY, SNR, Signal Average, Signal Median, Signal Std, Signal pixels, Background Average, Background Median, Background Std.

Data filtration and normalization: All the data processing was performed under the R System v1.6.2 (R Development core TeamTM software). The data was filtered to eliminate background data points (spots with size less than 75 pixels or with a mean to median correlation less than 80% (Tran and Peiffer, 2002, Nucleic Acids Res. 30(12), e54), to eliminate saturated data points (spots with a proportion of saturated pixels greater than 20%), and to eliminate low signal data points (spots with signal to noise ratio below 2). The signal was corrected for background and the signal volume was estimated as (Signal Average – Background Average) x Signal pixels. The base 2 logarithm of the ratio and the product between Cy5 and Cy3 was calculated as:

$$M = \log_2(\text{Cy5/Cy3}) \quad (1)$$

$$A = \log_2(\text{Cy5} \times \text{Cy3}) \quad (2)$$

Data was normalized using locally weighted linear regression of M vs. A over rank consistency filtered data for each print tip (rank consistent print tip lowest fit) for 150 or more data points, or using a rank consistent global lowest fit algorithm when the number of data points was below 150.

For the rank consistency filter, the rank of Cy3 and Cy5 intensities of each gene on the slide were separately calculated. For a given gene, if the ranks of Cy3 and Cy5 intensities differed by less of a threshold value d , this gene was classified as rank consistent. This process was iteratively repeated until the number of rank consistent genes did not change. The threshold level d was defined as follows:

$$d = p \cdot (1 + 1/i) \cdot \text{fn}(A) \cdot n \quad (3)$$

where i is the iteration number; n is the number of data points, which is equal to the number of spots in the slide for the first iteration cycle, and equal to the number of rank consistent genes defined in cycle $i-1$ for the next cycles; $\text{fn}(A)$ is the normal density function with mean equal to the average of A and standard deviation (SD) equal to the estimated SD of A ; and p is a proportionality constant that was set to 0.5.

Then, the value of M for each value of A that follows the central tendency of the data (M_c) was estimated from the rank consistency data with the R package lowest function, and it was subtracted from the empirical M value to obtain the normalized M data (M'). From this point, all further analysis was performed with the normalized M' data.

Outlier data points were eliminated from the triplicate data with a leave-one-out algorithm. Briefly, a data point was discarded as being outlier if it was outside the confidence interval defined by the other two data points with a confidence level of 95%.

A gene expression data set was generated for each slide with the average of non-outlier data points.

Differences in scale between Cy3 and Cy5 channels can lead to an asymmetric distribution of M' data. To correct this deviation, M' data was transformed to be normally

distributed. First, a uniform distributed data set between 0 and 1 was obtained with the transformation $Mu = \text{rank}(M')/(n+1)$, where n is the number of data points. Then, a normal distributed data set, with mean equal to the median of M' and SD equal to the estimated SD of M' , was obtained with the transformation: $Mn = \text{qnorm}(Mu)$, where qnorm is the normal quantile function included in the R package.

Data integration between replicated slides: Each labeled probe was hybridized at least twice. If the scale (i.e. variance) between replicated slides was different ($p < 0.05$, Fligner-Killeen test for homogeneity of variances), data were transformed to be equally scaled. Assuming that the ratios follow a normal distribution with mean zero and variance $a_i^2\sigma^2$, we estimated a_i as follows:

$$a_i = \frac{MAD_i}{\sqrt{\prod_{i=1}^I MAD_i}} \quad (4)$$

with I denoting the total number of slides, and the median absolute deviation MAD defined by,

$$MAD = \text{median}_j |M_{ij} - \text{median}_j(M_{ij})| \quad (5)$$

where M_{ij} denotes the j^{th} spot in the i^{th} slide.

Outlier data points were eliminated from three or more replicated data sets with a leave-one-out algorithm as described above, and an integrated data set was obtained with the averaged M values from non-outlier data.

Analysis and integration of replicated experimental data and noise analysis:

Experiments were performed at least twice. If the scale (i.e. variance) between replicated experiments was different ($p < 0.05$, Fligner-Killeen test for homogeneity of variances), data were transformed to be equally scaled.

Outlier data points were eliminated from three or more replicated data sets with a leave-one-out algorithm. The arithmetic mean (Mn) and SD were estimated from the non-outlier data set. A noise sampling method was used for p-value estimation (Draghici et al., Noise sampling method: an ANOVA approach allowing robust selection of

differentially regulated genes measured by DNA microarrays, *Bioinformatics*, in press). Briefly, an estimation of the noise is obtained from the replicated data as the difference between the ratio expression for gene g in experiment e and the mean for gene g among experiments. Because noise varies with intensity: low intensity spots tend to have more noise than high intensity ones, the intensity range was divided in bins, and noise distributions constructed for each such bin. Assuming that the noise distribution is normal, which was the case for most experiments, it was mapped from the distribution of the noise to the distribution of the log ratios by the scaling factor $1 / \sqrt{n - 0.5}$, where n is the number of replicates.

Cluster analysis: Before cluster analysis, the data was scaled as follows: $M_s = (M - M_n(M)) / SD(M)$. A figure of merit algorithm (Yeung et al., 2001, *Bioinformatics*, 17(4):309-18) was used to identify the clustering algorithm and the number of clusters that minimized the intra-cluster variability. After examining the figure of merit of all the datasets analyzed with seven different clustering algorithms and different variations of such algorithms that led to a total of 51 different clustering methods, it was decided to subset the data in 12 clusters with a hierarchical algorithm using euclidean distance between gene expression patterns and a Ward's minimum variance agglomeration method (Hartigan (1975). Clustering Algorithms. New York: Wiley.). Genes with similar expression patterns among the experiments were clustered together using routine hierarchical clustering techniques.

Results

After quality filtering and normalizing the microarray data, sequences with a p-value below 0.05 were identified as differentially expressed (DE). Further analysis was performed on this subset of sequences to select and cluster sequences according to specific criteria. Genes with similar expression patterns among the experiments were clustered together using hierarchical clustering techniques as described above.

Cluster analysis I: A first clustering analysis (cluster analysis I) identified DE sequences ($p < 0.05$) up- or down-regulated in one of two experimental time points tested (72 and 192 hours). These are shown for the colon cancer model in FIG. 2 (DE sequences in midbrain), FIG. 8 (DE sequences in cortex), FIG. 14 (DE sequences in striatum), and FIG. 18 (DE sequences in hypothalamus). Cluster graphs (the last sheet of

each Figure) show whether genes in a particular cluster were up- or down-regulated (y-axis) at each time point tested (x-axis). For example, in FIG. 2-8, clusters 4- 6 were up-regulated at 72 hours (x-axis 1.0) and clusters 9-12 were up-regulated at 192 hours (x-axis 2.0). In FIG. 8-13, clusters 9 and 10 were down-regulated at 192 hours while clusters 11 and 12 were up-regulated at 192 hours. In FIG. 14-8, clusters 4, 5 and 6 are close to midline at 72 hours and down-regulated at 192 hours. FIG. 18-8 shows clusters 11 and 12 up-regulated at 192 hours.

Cluster analysis II: A more stringent clustering analysis (cluster analysis II) revealed DE sequences ($p < 0.05$) up- or down-regulated in both experimental time points tested. These are shown in FIG. 3 (DE sequences in midbrain), FIG. 9 (DE sequences in cortex), FIG. 15 (DE sequences in striatum), and FIG. 19 (DE sequences in the hypothalamus). For example, FIG. 3-2 shows that only cluster 7 is up-regulated at both time points, while the rest of the clusters are down-regulated at both time points. FIG. 19-2 shows that only cluster 4 is up-regulated at both time points.

Secreted markers: In a third analysis, the filtered data were reclustered to select sequences that should correspond to a secreted product and have a p value for differential expression below 0.05 ($p < 0.05$). The results of this analysis for colon cancer is shown in FIG. 24(A). FIG. 24(A) lists markers corresponding to secreted products, that were differentially expressed in the colon cancer model at any time point studied. Secreted markers are particularly useful in that their expression can be detected in cerebral or cerebrospinal fluid, avoiding the need for a solid tissue biopsy.

Shared DE markers: In a final analysis, the filtered data were reclustered to select sequences that were differentially expressed in all tumors analyzed. Seven DE sequences were found to be shared among all three carcinomas studied. These were hepatocyte growth factor (HGF), apherin A3, chemokine (C-C motif) ligand 4, growth differentiation factor-9b (GDF-9b); bone morphogenetic protein 15 (BMP 15), neuroblastoma suppressor of tumorigenicity 1, melanocyte proliferating gene 1, and fibroblast growth factor 22 (FGF 22). (FIG. 26)

Example 2: CNS Gene Expression Profile Associated With Breast Carcinoma

This example describes the identification of brain gene expression profiles associated with breast carcinoma.

BALB-C mice were injected subcutaneously with 1×10^5 4T-1 breast carcinoma cells (ATCC cat # : CRL-2539) resuspended in 100 μ l of PBS. All experimental methods, microarrays and data analysis were otherwise performed as described above for Example 1.

Results

Quality filtering, normalization and analysis of the microarray data was performed as discussed above.

Cluster analysis I: a first clustering analysis (cluster analysis I) identified DE sequences ($p < 0.05$) up- or down-regulated in only one of the three experimental time points tested (18, 72 and 192 hours). These are shown for the breast cancer model in FIG. 4 (DE sequences in midbrain), FIG. 10 (DE sequences in cortex), and FIG. 20 (DE sequences in hypothalamus). For example, FIG. 4-16 shows that the genes of cluster 1, 2 and 3 were up-regulated at 72 hours (x-axis 2.0). In FIG. 10-13, clusters 2 and 3 show up-regulation at 72 hours. In Fig. 20-21, only clusters 5-7 are down-regulated at 192 hours (x-axis 3.0).

Cluster analysis II: a more stringent clustering analysis (cluster analysis II) revealed DE sequences ($p < 0.05$) up- or down-regulated in at least two of the three experimental time points. These are shown in FIG. 5 (DE sequences in midbrain), FIG. 11 (DE sequences in cortex), and FIG. 21 (DE sequences in hypothalamus). In FIG. 5, only cluster 7 shows up-regulation at any time point, while the remaining clusters are generally down-regulated. Similarly, only one cluster (cluster 6) is up-regulated in FIG. 11-6. Only clusters 10-12 are up-regulated in FIG. 21-7.

Secreted markers: in a third analysis, the filtered data were reclustered to select sequences that correspond to a secreted product and have a p value for differential expression below 0.05 ($p < 0.05$). The results of this analysis for breast cancer is shown in FIG. 24B. FIG. 24B lists markers corresponding to secreted products, that were differentially expressed in the breast cancer model at any time point studied.

Example 3: CNS Gene Expression Profile Associated With Lung Carcinoma

This example describes the identification of brain gene expression profiles associated with lung carcinoma.

Male C-57/BL6 mice were injected subcutaneously with 1×10^6 lung carcinoma LL/2(LLC1) cells (ATCC cat # : CRL-1642) resuspended in 300 μ l of PBS. All experimental methods, microarrays and data analysis were otherwise performed as described above for Example 1.

Results

Quality filtering, normalization and analysis of the microarray data was performed as discussed above.

Cluster analysis I: a first clustering analysis (cluster analysis I) identified DE sequences ($p < 0.05$) up- or down-regulated in only one of the three experimental time points tested (18, 72 and 192 hours). These are shown for the lung cancer model in FIG. 6 (DE sequences in midbrain), FIG. 12 (DE sequences in cortex), FIG. 16 (DE sequences in striatum), and FIG. 22 (DE sequences in hypothalamus). For example, FIG. 6-15 shows that clusters 2, 3 and 4 are up-regulated at 72 hours (x-axis 2.0) while clusters 5-11 are up-regulated at 18 hours (x-axis 1.0). FIG. 12-13 shows that clusters 2, 3 and 4 are up-regulated at 72 hours. In FIG. 22-21, only clusters 3, 4, 8 and 9 are down-regulated at 192 hours.

Cluster analysis II: a more stringent clustering analysis (cluster analysis II) revealed DE sequences ($p < 0.05$) up- or down-regulated in at least two of the three experimental time points. These are shown in FIG. 7 (DE sequences in midbrain), FIG. 13 (DE sequences in cortex), FIG. 17 (DE sequences in striatum), and FIG. 23 (DE sequences in hypothalamus). In FIG. 7-5 and FIG. 17-5, all the clusters, except for cluster 12 in each set, are down-regulated at every time point studied. FIG. 13-6 shows that all but two clusters (11 and 12) were down-regulated.

Secreted markers: in a third analysis, the filtered data were reclustered to select sequences that correspond to a secreted product and have a p value for differential expression below 0.05 ($p < 0.05$). The results of this analysis for lung cancer is shown in FIG. 24C. FIG. 24C lists markers corresponding to secreted products, that were differentially expressed in the lung cancer model at any time point studied.

Example 4: Diagnosis of Cancer in a Human by Detecting a Gene Product Profile

This example describes a diagnostic test for non-CNS carcinoma performed on a human subject. The subject is a carrier of the BRCA1 breast cancer susceptibility gene.

5 A CSF sample is obtained from the subject by means of a lumbar puncture. This procedure is done on an outpatient basis under local anesthetic. The CSF sample is used immediately in the diagnostic assay, or is cooled or frozen and stored or transported to a facility where the diagnostic test is performed.

10 The diagnostic test involves contacting the CSF sample to an antibody array containing a panel of 25 antibodies that can detect a set (cluster) of CNS gene products that are associated with the presence of breast cancer when secreted in a characteristic profile in the CSF. The panel includes antibody probes for one or more CNS markers for breast carcinoma listed in FIG. 24B. Thus, in this example, the characteristic profile is the CNS "reference profile" for breast carcinoma.

15 The results of the antibody array are obtained by routine techniques, such as fluorescence detection and measurement of bound antibody vs. unbound antibody for each position (each antibody) on the array. A dataset of the value for the level of each polypeptide detected in the CSF sample by each antibody on the array is generated. The dataset is used directly as the test expression profile or the dataset is converted into a
20 format comparable to the format of the reference profile to which the test profile is compared.

Once the test expression profile is generated, the test profile is compared to the reference expression profile. In this example, the reference profile is a dataset that includes relative values of expression for a panel of 10 CNS gene products secreted into
25 the CSF, all of which are known to be down-regulated at least 30%, on average, in subjects who have early stage breast cancer. The gene products include one or more of the gene products shown in FIG. 4, 10, 20, 5, 11, 21 or 24B. If the test profile shows that 7 or more of the genes in the panel are down-regulated by at least 20% in the test sample, the test profile matches the reference profile and the subject is determined to have (or be
30 at risk for) early stage breast cancer.

OTHER EMBODIMENTS

A number of embodiments of the invention have been described. Nevertheless, it will be understood that various modifications may be made without departing from the spirit and scope of the invention. Accordingly, other embodiments are within the scope
5 of the following claims.

We claim:

1. A method of diagnosing a non-central nervous system (non-CNS) disorder in a subject, the method comprising:

5 detecting expression of a gene in a CNS sample of the subject, and
correlating the result of the detecting step to the presence or absence of a non-CNS disorder.

2. The method of claim 1, further comprising the step of obtaining the CNS sample.

3. The method of claim 1, wherein the CNS sample is one or more brain cells.

4. The method of claim 3, wherein the brain cells are selected from the group consisting of cells from: the hypothalamus, the midbrain, the prefrontal cortex and the
15 striatum.

5. The method of claim 1, wherein the CNS sample is cerebrospinal fluid.

6. The method of claim 1, wherein the non-CNS disorder is selected from the group consisting of: cancer, rheumatoid arthritis, asthma, diabetes and obesity.
20

7. The method of claim 1, wherein the non-CNS disorder is a carcinoma.

8. The method of claim 1, wherein the non-CNS disorder is a solid tumor less than
25 0.5 cm in diameter.

9. The method of claim 1, wherein the gene encodes a gene product selected from the group consisting of: a hormone, a growth factor, an immune system component, a cytokine.
30

10. The method of claim 7, wherein the gene encodes a gene product listed in any of FIGS. 2-26, or a human or other mammalian homolog thereof.

11. The method of claim 7, wherein the gene encodes a gene product selected from the group consisting of: hepatocyte growth factor (HGF), apherin A3, chemokine (C-C motif) ligand 4, growth differentiation factor-9b (GDF-9b); bone morphogenetic protein 15 (BMP 15), neuroblastoma suppressor of tumorigenicity 1, melanocyte proliferating gene 1, and fibroblast growth factor 22 (FGF 22).

12. The method of claim 1, wherein detecting expression of the gene comprises detecting the mRNA corresponding to the gene.

13. The method of claim 1, wherein detecting expression of the gene comprises detecting a polypeptide product encoded by the gene.

14. The method of claim 1, wherein detecting comprises detecting expression of a plurality of genes in a CNS sample of the subject

15a. The method of any one of the preceding claims, wherein the detecting step comprises performing a microarray assay.

15b. The method of claim 1, wherein the subject is a human.

16. A method of diagnosing a non-central nervous system (non-CNS) disorder in a subject, the method comprising:

obtaining a test gene expression profile for two or more CNS genes from the subject; and

comparing the test gene expression profile with a reference gene expression profile associated with the presence of a non-CNS disorder, wherein a test gene expression profile that matches the reference gene expression profile indicates the subject has a non-CNS disorder.

17. The method of claim 16, further comprising generating a record of the result of the comparing step; and optionally transmitting the record to the subject, health care provider or other party.

5

18. The method of claim 16, wherein the non-CNS disorder is selected from the group consisting of: cancer, rheumatoid arthritis, asthma, diabetes and obesity.

19. The method of claim 16, wherein the non-CNS disorder is a carcinoma.

10

20. The method of claim 16, wherein the non-CNS disorder is a solid tumor less than 0.5 cm in diameter.

21. The method of claim 16, wherein at least one of the two or more CNS genes is selected from the group consisting of: a hormone, a growth factor, an immune system component, and a cytokine.

15

22. The method of claim 19, wherein at least one of the two or more CNS genes encodes a gene product listed in FIGS. 2-26, or a human or other mammalian homolog thereof.

20

23. The method of claim 19, wherein at least one of the two or more CNS genes encodes a gene product selected from the group consisting of: hepatocyte growth factor (HGF), apherin A3, chemokine (C-C motif) ligand 4, growth differentiation factor-9b (GDF-9b); bone morphogenetic protein 15 (BMP 15), neuroblastoma suppressor of tumorigenicity 1, melanocyte proliferating gene 1, and fibroblast growth factor 22 (FGF 22).

25

24. The method of claim 16, wherein the step of obtaining the test gene expression profile comprises detecting mRNA corresponding to the two or more CNS genes.

30

25. The method of claim 16, wherein the step of obtaining the test gene expression profile comprises detecting polypeptide products encoded by the two or more CNS genes.

26. The method of claim 16, comprising obtaining a test gene expression profile for a plurality of CNS genes.

27. The method of any one of claims 16-26, wherein the step of obtaining the test gene expression profile comprises performing a microarray assay.

28. A method of treating a subject, the method comprising:
diagnosing a non-central nervous system (non-CNS) disorder according to the method of claim 1 or 16; and
administering to the subject a therapeutic agent for the disorder.

29. The method of claim 28, wherein the therapeutic agent is chemotherapeutic agent.

30. The method of claim 29, wherein the chemotherapeutic agent is selected from the group consisting of: an antitubulin/antimicrotubule drug, a topoisomerase I inhibitor, an antimetabolite, and an alkylating agent.

31. A method of identifying a diagnostic marker for a non-central nervous system (non-CNS) disorder in a human, the method comprising:

inducing a non-CNS disorder in a test experimental animal;

comparing expression of a gene in a CNS sample from the test experimental

animal to expression of the gene in a CNS sample from a control experimental animal;
and

selecting as a diagnostic marker a human homolog of a gene that is differentially expressed in the CNS sample from the test experimental animal compared to the CNS sample from the control experimental animal.

32. The method of claim 31, wherein a non-CNS neoplasm is induced by chemical or radiation mutagenesis.

33. The method of claim 31, wherein a non-CNS neoplasm is induced by
5 administering a neoplastic cell to the experimental animal.

34. The method of claim 31, wherein the experimental animal is an animal model of rheumatoid arthritis, diabetes, asthma, obesity or diabetes.

10 35. The method of claim 31, wherein the experimental animal is a non-human primate.

36. The method of claim 1, 16 or 28, wherein the subject lacks a clinical sign of a disorder as evaluated by imaging analysis.

15

37. The method of claim 1, 16 or 28, wherein the subject has a family history of the disorder.

38. The method of claim 1, 16 or 28, wherein the subject is a carrier of a gene
20 associated with increased the disorder.

39. The method of claim 38, wherein the subject is a carrier of the BRCA1, BRCA2, hMSH2, hMLH1, or hMSH6 gene.

25

FIGURE 1

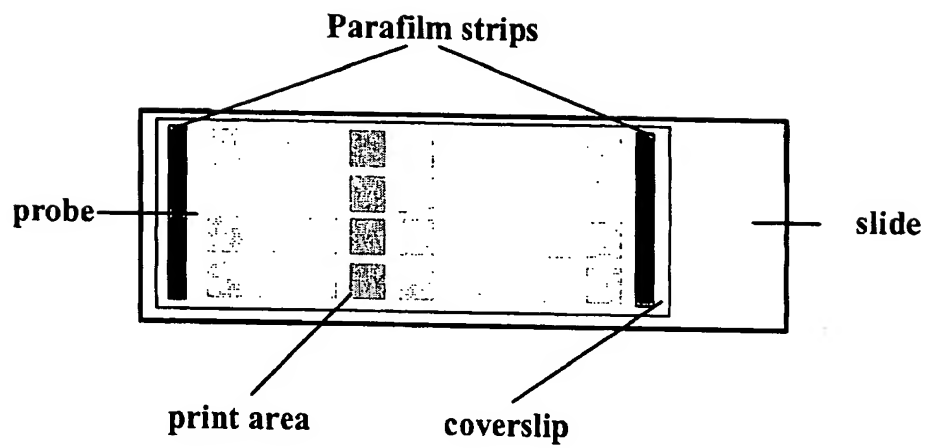


FIGURE 2-1

Cluster	Access	Locus	Gene	Description
1	AK005311	11787	Apbb2	amyloid beta (A4) precursor protein-binding, family B, member 2
1	AF135665	14425	Galm3	udp-n-acetyl-alpha-D-galactosamine:polypeptide n-acetylglucosaminyltransferase galn3
1	NM_015738	12168	Bmpr2	bone morphogenetic protein receptor type II serine/threonine kinase bmp2, morphogenetic ser/ltr
1	NM_007581	66362		Similar to RR40_HUMAN Exosome complex exonuclease RRP40 (Ribosomal RNA processing protein 40) (CGI-102) 87%
1	AK016397			
1	NM_011275			
1	BC005600			
1	U58773			
1	AK013145			
1	AK015260			
1	NM_010765			
1	NM_019764			
1	BC017627	22269	Upk2	uroplakin II mup2
1	NM_009478	67332	Snrp3	small nuclear ribonucleoprotein D3
1	NM_026095			
1	NM_011246	69746		RIKEN cDNA 2410019A14 gene
1	AK010555	53319	Nxf1	nuclear rna export factor
1	NM_016813			
1	AK006538			
1	AK021076			
1	NM_020484			
1	NM_008039			
1	AK018437			
1	AK012825	11600	Appt	angiotensin
1	NM_009640	235339	Dlat	dihydropyrimidine S-acetyltransferase (E2 component of pyruvate dehydrogenase complex)
1	AY041265	53870	Cnrm6	contactin 6 - neural recognition molecule NB-3 [Mus musculus] 100 %
1	NM_017383			
1	AK005572	11803	Adip1	amyloid beta a4 precursor-like protein apip1
2	NM_007467	13383	Dcp11	discs, large homolog 1 (Drosophila)
2	NM_007862	21909	Hox1111	T-cell leukemia, homeobox 2
2	NM_008392	57377	Gcs1	glucosidase 1
2	NM_020619	80987	Wisp9	n-wasp binding protein wisp
2	NM_030729	68443		adult male liver riken cDNA clone:1300019p08
2	AK005070			
2	BC010810	74603	Galp2	antigen identified by monoclonal antibody MRC OX-2 receptor (41% Mus musculus)
2	AK014871	14422	Fkbp1	udp-n-acetyl-alpha-D-galactosamine:n-acetylneuraminy-galactosyl- n-acetylglucosaminyltransferase galp2
2	NM_008081	56299	Olfir17	FK506 binding protein-like
2	NM_018873	18314	Nks3-1	homeobox-containing protein nks-3.1; homeobox nks3.1
2	NM_020598	18095	Catna1	catenin alpha 1
2	NM_010921	12385	Kcnd3	potassium voltage-gated channel, Shal-related family, member 3
2	NM_009818	56543	Lgals9	lectin, galactose binding, soluble 9
2	NM_019311	16859		DNA segment, Chr 7, ERA10 D04753, expressed
2	NM_010708	52432		
2	AK005033			
2	NM_023689			
2	AK002353			
2	NM_008492	19325	Rab10	RAB10, member RAS oncogene family - RB10_HUMAN Ras-related protein Rab-10 100 %
2	NM_016876	66784		RIKEN cDNA 4933439F11 (100% Mus musculus)
2	NM_025766			
2	NM_009172	11449	Chrmg	cholinergic receptor nicotinic gamma polypeptide chrmg: muscle acetylcholine gamma-subunit
2	NM_009604	68235	Bmx	RIKEN cDNA 2410066E13 gene
2	NM_026629	12169		BMX non-receptor tyrosine kinase
2	NM_009759			
2	NM_011828	78911	Klf17	T09013 RING finger protein Fxy - 24% mouse
2	AK019654	16559	Zan	kinesin 17 klf17
2	NM_010623	22635		acetylcholinesterase ache and d5erid555a asr2 alternatively spliced lrp8 cip1 ephb4 zan: zonadhesin sperm membrane protein zona pellucida binding
2	NM_011741	56277	Chmb3	19.5 m32486
2	NM_019631	108043		cholinergic receptor, nicotinic, beta polypeptide 3
3	AK017571	75770	Gord9	RIKEN cDNA 4833424K13 gene
3	AK014760	80978		G protein-coupled receptor 90
3	NM_030726			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700122C07 product:serine/threonine kinase 33,
3	AK007235	74320		16 days embryo lung riken cDNA clone:8430413n20
3	AK018406			

FIGURE 2-2

cluster analysis 1
colon cancer
midbrain

Cluster	Access	Locus	Gene	Description
3	AK016101	75266		S6619 Mos 20 protein - (42% human)
3	NM_026249	67576		RIKEN cDNA 4930429B2.1 gene
3	AK019452	71710		S44243 endosomal protein - human 20 %
3	AK004646	108077	Sliv2l	skl2w protein ski
3	AK021409	66898		Insulin receptor tyrosine kinase substrate (90% human)
3	AK004918	73259		KIP1_MOUSE DNA-PKcs Interacting protein (Kinase Interacting protein) (KIP) (Calcium and Integrin-bin 43 %
3	AK006670			
3	NM_029478	69371		PHZ2_MOUSE Probable oxidoreductase 0610038K03Rik 100 %
3	AK002802	27385	Magel2	melanoma antigen, family L, 2
3	NM_013779			
3	AK021330	74776		Inorganic pyrophosphatase [Homo sapiens] 71 %
3	BC011417			
3	AK013503	12814	Col11a1	a1(I) collagen chain
3	NM_007729			
3	NM_023480	56469	Pias1	adult male hippocampus riken cdna clone:2900069c24 full insert sequence; dead/h asp-glu-ala-asph/s box binding protein ddx1p1
3	NM_019663	18787	Pfcb3	phospholipase c beta3
3	NM_008874			
3	AK016624			
3	NM_008834	19878	Rock2	Rho-associated coiled-coil forming kinase 2
3	NM_009072	70770		POL2_MOUSE Retrovirus-related POL polyprotein [Contains: Reverse transcriptase ; Endonuclease(32 % M.musculus)
3	AK014334	73914	Irak3	Interleukin-1 receptor-associated kinase M (73% human)
3	AK014783			
3	AK014242	12572	Cdk7	cyclin-dependent kinase 7 (homolog of Xenopus MO15 cdk-activating kinase)
3	U11622			
3	NM_019768			
3	AK020727			
3	NM_011042	18521	Pcbp2	polyc-binding protein splice variant e; alpha-cp2 pcbp2 hmmp-e2
3	NM_009196	20501	Slc16a1	monocarboxylate transporter
3	AK014543	70804		progesterone membrane binding protein [73% Homo sapiens]
3	AK015110			
3	AK006258	170676	Peg10	paternally expressed 10
3	AF302691	14547	Gdab2	ganglioside-induced differentiation-associated-protein 2
3	AK004887			
3	NM_024473	71227		WD repeat domain 58 [Homo sapiens] 31 % /
3	AK016977			
3	NM_016779	110880	Scn4a	sodium channel, voltage-gated, type IV, alpha polypeptide
3	AJ278787			
3	AK009010	74315		patched related protein translocated in renal cancer [28.14% Homo sapiens]
3	AK014408	73300		adult male testis riken cdna clone:1700031105
4	AK006578	67123	Ubap1	ubiquitin-associated protein 1
4	NM_023305			
4	NM_008233	12489	Cd33	m33-b isoform cd33 antigen homolog [alternatively spliced] cd33 homolog
4	NM_021293	16210	Impad	imprinted and ancient
4	NM_008378			
4	BC004045			
4	AK011703			
4	NM_021889	66294	Tetran	tetracycline transporter-like protein
4	NM_026660	68938	Aspcr1	alveolar soft part sarcoma chromosome region, candidate 1 (77 %human)
4	BC019177	19012	Ppap2a	phosphatidic acid phosphatase 2a ppap2a
4	NM_008903			
4	AK007715	12725	Cten3	chloride channel protein cten3
4	NM_007711			
4	AK003744	17380	Mme	membrane metallo endopeptidase mme
4	NM_008604	75580		zinc finger protein 295 (32% human)
4	AK009517	76933		TLH29 protein precursor [Homo sapiens] 63 %
4	AK010014			
4	NM_019945	69956		hypothetical protein FLJ20758 (73% human)
4	AK013131	26878	B3gall2	udp-gal:beta1,3-galactosyltransferase polypeptide b3gall2
4	NM_020025	17210	Mcd1	myeloid cell leukemia sequence 1
4	NM_008562	19897	Rpl12	11 days embryo riken cdna clone:2700054c07; ribosomal protein rpl12
4	NM_009076			

FIGURE 2-3

Cluster	Access	Locus	Gene	Description
4	NM_019464	54673	Sh3bp1	endophilin b1/alternatively spliced alternatively family member ortholog of b1 sequence
4	AK016777	67539		160466 gene trig protein - 35% rat (fragment)
4	AK009460			
4	NM_011202			
4	U14172			
4	NM_022505	17965	Nbt1	neuroblastoma, suppression of tumorigenicity 1
4	NM_008675	18975	Pdg	mitochondrial dna polymerase gamma polg nuclear product corresponding sequence deposited at: encoding protein
4	NM_017482	72819		RIKEN cDNA 2810487F15 gene
4	AK013448			
4	BC017127	17448	Mor1	mitochondrial malate dehydrogenase mmdh precursor; 51kDa and
4	NM_008617	14802	Gria4	glutamate receptor ionotropic ampa4 alpha 4 gria4
4	NM_016691			
4	X85226	74742		RIKEN cDNA 5830411J07 gene
4	NM_023082			
4	NM_012033			
4	AK015961	12592	Cdx4	caudal type homeo box cdx4
4	NM_007674	76968		RIKEN cDNA 2310046K23 gene
4	AK009853			
4	AK016531			
4	L20343	12296	Cacnb2	calcium channel, voltage-dependent, beta 2 subunit
4	NM_019566	56212	Ahrq	ras homolog gene family, member G
4	NM_016766	51812	Mcr3	microspherule protein clone mgc-5852; nucleolar msp58
5	NM_018916	27140	Tlx3	T-cell leukemia, homeobox 3
5	AK015229	19917	Pparc1	peroxisome proliferative activated receptor, gamma, coactivator 1
5	NM_008904	14772	Gprk2	g protein-coupled receptor kinase gprk4 previously called it-11
5	NM_019497	14683	Gnas	GNAS (guanine nucleotide binding protein, alpha stimulating) complex locus
5	NM_010039	81535	Sgpp1	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
5	NM_030750	19087	Pkar2a	protein kinase, cAMP dependent regulatory, type II alpha
5	J02935	14231	Fkbp7	fk506-binding protein fkbp23 glycoprotein 28kDa retained in the er by c-terminal hdel
5	NM_010222	74287	Pncl	potassium channel modulatory factor
5	NM_019715			
5	BC017648	72972	Sich	RIKEN cDNA 2900054P12 gene
5	AK005531	110920	Aco2	stress 70 protein chaperone, microsome-associated, human homolog
5	AK021006	11429		mitochondrial aconitase nuclear acc2 clone mgc-7148
5	NM_080633	74048		RIKEN cDNA 4632428N05 gene
5	NM_028732			
5	NM_016716			
5	AK016694	18974	Pole2	dna polymerase epsilon small subunit
5	AF036898			
5	BC011211			
5	NM_008137	75608		HSPC134 protein [80% Homo sapiens]
5	BC006805			
5	NM_018819			
5	NM_011867			
5	NM_010887	17993	Ndufs4	nadh dehydrogenase ubiquinone fe-s protein 4 18 kDa ndufs4; 13 days embryo liver riken cDNA clone:2510049012
6	AK007452			
6	AB035381	19367	Rad9	RAD9 homolog (S. pombe)
6	NM_011237	20588	Smarrc1	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily c, member 1
6	NM_009211	21673	Dnlt	deoxynucleoside diphosphate kinase, terminal
6	NM_009245			
6	AK010292	59289	D6	beta-chemokine receptor d6
6	NM_021609			
6	S45012	75209		A43344 synaptic vesicle protein SV2 (58% rat)
6	AK015821	59053	Brp16	brain protein 16; DNA segment, Chr 15, ERATO Ddl 741, expressed [Mus musculus] 100 %
6	NM_021555	107767	Scamp1	SECRETORY CARRIER-ASSOCIATED MEMBRANE PROTEIN 1
6	AK015906			
6	AF175996	71541		hypothetical protein FLJ12118 [77% Homo sapiens]
6	AK009397			
6	NM_020493			
6	NM_010883			
6	NM_026119			
6	AK006619			
6	AK017598	17986	Ndph	Norrie disease homolog

FIGURE 2.4

Cluster	Access	Locus	Gene	Description
6	NM_015728	27878		SPT3-associated factor 42 [95% Homo sapiens]
6	BC002307	75556		RIKEN cDNA 1700028D08 gene
6	AK006375	75102		RIKEN cDNA 5730493B19 [84.21% Mus musculus]
6	NM_015717			
6	NM_009508			solute carrier family 25 (mitochondrial carnitine/acylcarnitine translocase), member 20
6	AK003611	57279	Slc25a20	
6	NM_020520			adult male tongue riken cdna clone.2310009g03
6	AK007964	50529	Mipa7	
6	AK009525			ATPase, H+ transporting, V1 subunit D
6	AK014595	73834	atp6v1d	T12468 hypothetical protein DKFZp564O123.1 - human 97 %
6	NM_023721	68942		tissue inhibitor of metalloproteinases-3
6	AK004506	21659	Timp3	
6	NM_011595			hypothetical protein, BC004044; hypothetical protein MGC7673 [Mus musculus] 100 %
6	AK012931	80752		hypothetical protein FLJ111767 (58% human)
6	NM_025482	77036		5-3 exoribonuclease 1
7	NM_030565	24127	Xm1	serine/threonine kinase FKSG91 [Homo sapiens] 44 %
7	AK007150	71099		inhibitor of kappaB kinase gamma
7	AK016890	16151	Ikbkg	OG2 homeobox gene
7	NM_010547	18291	Og2x	mdj10 deduced amino acid sequence of is homologous to c. elegans putative dnaJ protein z73.02 b0035.14, homolog
7	AY061761	56709	Dnajb12	
7	NM_019965			pancreatic polypeptide
7	NM_026537	19064	Ppy	RIKEN cDNA 4921525L17 gene
7	NM_009918	70918		RIKEN cDNA 2310016G11 gene
7	AK014968			ornithine aminotransferase cat
7	NM_015771	69578		prospadinban [Mus musculus] 100 %
7	AK009387		Oal	plectin-1, intermediate filament binding protein, 500KD [Homo sapiens] 25.74 %
7	AB047820	18242		photail-12-myristate-13-acetate-induced protein 1; Nova protein [Mus musculus] 100 %
7	NM_016978	18821	Pin	interferon gamma receptor 2
7	NM_023129	74902	Pnelp1	GTPase regulator associated with the focal adhesion kinase pp125 [Homo sapiens] 56.19 %
7	AK015166	58801		colony stimulating factor 3 receptor granulocyte csf3r
7	NM_021451	15980	Ilng2	ST3035 aspartate transaminase (EC 2.6.1.1) - human 40 %
7	NM_008338			olfactory receptor 159
7	AK020725	71544		RIKEN cDNA 2010003D20 gene
7	AK018520	12986	Csf3r	atp-binding cassette sub-family g white member abcg3
7	NM_007782	76615		glucokinase activity, related sequence 2
7	AK006984	20849		hydroxysteroid dehydrogenase-5, delta<5>-3-beta
7	NM_019476	72058	Olfir159	prolactin-like protein A
7	AK008060	27405	Abcg3	frizzled-1
7	NM_030239	14626		growth arrest specific 5
7	NM_010234	15496	Gk-rs2	serologically defined colon cancer antigen 10
7	NM_008295	19110	Hs43b5	RIKEN cDNA 5330439B14 gene
7	NM_011165	69904	Pripa	Similar to MOUSE Alpha-actinin 3 (Alpha actinin skeletal muscle isoform 3) (F-actin cross linking protein) 28%
7	AK011365	14362		polysulfam large conductance calcium-activated channel, subfamily M, beta member 2 [Homo sapiens] 95 %
7	NM_021457	14455	Fzd1	Lyszyme C, type M precursor (1,4-beta-N-acetylmuramidase C) (62% Mus musculus)
7	NM_013525	27383	Gas5	interferon induced transmembrane protein 4 like
7	AK010356	67285	Def6	
7	AK014025	321015	Sdcag10	phospholipase C, zeta 1
7	AK019938	75356		ectoplacental cone, invasive trophoblast giant cells, extraembryonic ectoderm and chorion sequence 3
7	AK016205	72413		zinc finger protein 120
7	AK012400	77397		hemogen
7	AK020538	74462	Nlk4	interferon regulatory factor 6 mif8 ifr6 transcription; clone mgc-5918
7	AK017110			phospholipase C, zeta 1
7	AK020739	114875	Picz1	low density lipoprotein-related protein 1B (deleted in tumors)
8	NM_054066	56095	Epic3	per-hexamer repeat gene 1
8	NM_025310	104348	Zfp120	
8	NM_023266			
8	NM_053149	93966	Hgn	
8	NM_016851	54139	Irf6	
8	AK005949	114875	Picz1	
8	NM_053011	94217	Lrp1b	
8	NM_011080	18586	Phx1	

FIGURE 2-5

Cluster	Access	Locus	Gene	Description
8	NM_031159	11810	Apobec1	apolipoprotein B editing complex
8	NM_022565	64580	Nds14	N-deacetylase/N-sulfotransferase (heparin glucosaminyl) 4; N-deacetylase/N-sulfotransferase 4 [Mus 100 % /
8	AK021099	77462		RIKEN cDNA C030022K24 gene
8	AK010577	76559		Similar to hypothetical protein FLJ10242 [95% Homo sapiens]
8	NM_007645	12493	Cd37	leukocyte surface antigen cd37
8	AK015107	73937		RIKEN cDNA 4930406E24 gene
8	AJ297743	30934	Tor1b	tor1in family 1, member B
8	NM_011705	22367	Vrk1	vaccinia related kinase 1
8	AK007540	69769		hypothetical protein FLJ23467 [Homo sapiens] 93 %
8	NM_011999	26888	Clec3e5	C-type (calcium dependent), carbohydrate recognition domain) lectin, superfamily member 6
8	AK017271	74721		RIKEN full-length enriched library, clone:5430405H02
8	AK015848	12937	Pcdh6b	zinc finger protein 341 [Homo sapiens] 90%
8	NM_007767	18192	Nsctm1	protocadherin alpha 6
8	NM_010840	78571		non-selective cation channel 1
8	AK021281	12891	Cpnc6	RIKEN cDNA C630050I24 gene
8	NM_009947	17391	Mmp24	copine VI
8	NM_010808	14211	Smc211	membrane-type-5 matrix metalloproteinase mt5-mmp; membrane-type 5
8	NM_008017	22024	Tox1	SMC2 structural maintenance of chromosomes 2-like 1 (yeast)
8	NM_009420	58168	Ors16	testis specific gene 1
8	NM_021368			odorant receptor 16
8	AK007167	73732		product hypothetical SEA domain containing protein
8	AK003577	63362	Siglece	myeloid inhibitory siglec m1m-containing transmembrane protein; sialic acid-binding immunoglobulin-like lectin a siglece
8	NM_031181	74249	Lrrc2	leucine-rich repeat-containing 2
8	AK010252	170740	Zfp287	zinc finger protein 287
8	AF281141			
8	M65237			
8	NM_020605	57340	Jph3	junctophilin 3; junctophilin type 3 [Mus musculus] 100 %
8	NM_013629	18685	Phf1	for phf protein
8	NM_008189	14911		gene trap ROSA 26 antisense, Philippe Soriano
8	NM_009128	20250	Scd2	stearoyl-coenzyme a desaturase scd2
9	NM_009043	19693	Rep2	regenerating islet-derived 2
9	NM_031187	17230	Mcp17	mast cell protease 7
9	NM_016986	53659	Map3k14	mitogen-activated protein kinase kinase kinase 14
9	NM_010918	18087	Nktr	natural killer tumor recognition sequence nkr
9	NM_008479	18768	Lag3	lymphocyte-activation gene 3
9	AK005332	75647		RIKEN cDNA 1700023E21 gene
9	AK014780	73763		RIKEN cDNA 4833427C06 gene
9	NM_021406	58217	Trem1	triggering receptor expressed on myeloid cells 1
9	NM_009594	13078	Cyp1b1	cytochrome P450, family 1, subfamily b, polypeptide 1
9	AK006964	73523		PEBP_MOUSE Phosphatidylethanolamine-binding protein (PEBP) 40 %
9	M26156	14590	H2-M2	histocompatibility 2, M region locus 2
9	NM_009914	12771	Ccr3	chemokine (C-C) receptor 3
9	AK017277			
9	AK011381	14029	Evi2	evi-2 even-skipped homeobox homolog mesodermal cell dorsoventral fates determinant this sequence comes from fig. 2 msp location
9	NM_007967	16828	Ldb2	LIM domain binding 2
9	NM_010639	69577		Fas-activated serine/threonine kinase (Mus musculus 31 %)
9	AK009264			
9	AK016908	18483	Palm	paralemnin Mus musculus] 100 %
9	NM_023128	231841		unknown
9	AF226663	13641	Elmb1	elphrin B1
9	NM_010110	78396		PRP1_HUMAN Salivary proline-rich protein precursor (Clones CP3, CP4 and CP5) [Contains: Basic peptid 28.42 %
9	AK005913	15507	Hsp25	day neonate skin nken cdna clone:463241509
9	AK019498	69113		RIKEN cDNA 5730493B19 [Mus musculus] 69.05 %
9	AK007557	244484	Wdr17	WD repeat domain 17
9	AK013889	70088		Similar to hypothetical protein FLJ11730 [97% Homo sapiens]
9	AK009177			
9	AK013137	19766	Ripk1	receptor (TNFRSF)-interacting serine-threonine kinase 1
9	NM_003068	75622		A Chain A, Crystal Structure Of Mutant Human Lysosome Substituted At Left-Handed Helical Positions 48 %
9	AK006357	13559	E2f5	e2f transcription factor 5 clone mgc:6043; e2f-5 protein
9	NM_007892	17063	Ly6a	lymphocyte antigen 64
9	NM_010739	12593	C6y1	chromodomain protein, Y chromosome-like
9	NM_009881	12805	Cnnt1	neuronal cell surface protein f3

FIGURE 2-8

Cluster	Access	Locus	Gene	Description
9	NM_021369	11440	Chrna6	nicotinic acetylcholine receptor subunit alpha6 nica6
10	AK016814	75727		RIKEN cDNA 4933415A04 gene
10	NM_019862	16565	Kif21b	kif21b kinesin-like protein
10	AK015780	74717		B59254 myosin heavy chain 12, splice form2 - human 28 %
10	AK016803	71159		Moloney leukemia virus 10-like 1 [Mus musculus] 37, 37
10	NM_022305	14595	B4gal1	UDP-Gal4:betaGalNAc beta 1,4- galactosyltransferase, polypeptide 1
10	NM_009423	22032	Traf4	Tnf receptor associated factor 4
10	NM_007680	13848	Ephb6	mep podline
10	NM_021540	59044	Rnf130	ring finger protein 130
10	NM_020488	57249	Gabra4	gaba-a receptor theta subunit family member
10	AK018420	71469		RIKEN cDNA 8430416G17 gene
10	NM_007770	12951	Crx	homeodomain protein crx homeobox
10	NM13806	16664	Krt11-14	keratin complex 1, acidic, gene 14
10	AK012908	212127		RIKEN cDNA 2810046L04 gene
10	AK016085	75287		RIKEN cDNA 4930550G17 gene
10	NM_010080	13517	Dspp	dentin sialophosphoprotein
10	AK021026	77849		RIKEN cDNA B430319H21 gene
10	NM_009500	22325	Vav2	vav2 oncogene
10	AK018700	67712	Mscp	mitochondrial solute carrier protein
10	AK016561	71346		ST2207 hypothetical protein (82 element) - mouse (68%, human)
10	NM_008866	18777	Lyp1a1	lysophosphatidase 1
10	AK006727	67003		adult male testis riken cdna clone:1700048h20; clone:49334.32e 16
10	AK021321	78589		RIKEN cDNA D730001C10 gene
10	AK015473	70952		KIAA1074 protein [Homo sapiens] 45.33 %
10	NM_010483	15564	Htr3b	5-hydroxytryptamine [serotonin] receptor 5B
10	NM_020282	258755	MOR32-4	olfactory receptor MOR32-4 - odorant receptor S46 gene [Mus musculus] 97 %
10	AK013060	17281	Fycp1	FYVE and coiled-coil domain containing 1
10	NM_053096	93673	Cmt2	carbamate-like 2
10	NM_008030	14262	Fmo3	flavin containing monooxygenase fmo3
11	NM_019540	69740	Ed2	CGI-30 protein [Homo sapiens] 85 % /
11	AK010475	13605		ed2 oncogene
11	BC002120			
11	NM_026204			
11	AK009111	56784	Tulp1	tubulin-like protein 1
11	AF121976	13874	Ereg	epiregulin
11	NM_007950	66568		RIKEN cDNA 0610011D08 gene
11	NM_025647			RIKEN cDNA 2610030N08 gene
11	D25987	69259		
11	AK011637			
11	AK005181			
11	AK019494	78281		Mus musculus 0 day neonate skin cDNA, RIKEN full-length enriched library, clone:4832413E21 product:weakly similar to PHOSPHOLIPASE B [Rattus n
11	NM_010234	14281	Fos	c-fos cellular homolog to viral oncogene c-fos protein
11	NM_033567	94047	Cecr6	cat eye syndrome chromosome region, candidate 6 homolog (human)
11	AK015886	75129		RIKEN cDNA 4830524J08 gene
11	AK005050			
11	NM_010004	13099	Cyp2c40	cytochrome P450, family 2, subfamily c, polypeptide 40
11	NM_080454	118454	Gip12	gap junction membrane channel protein alpha 12
11	AK002546	66058		hepatocellular carcinoma-associated antigen 112 [55% Homo sapiens]
11	AK018496	66817		9030409E16Rik RIKEN cDNA 9030409E16 gene
11	NM_011750	22868	Zfp162	zinc finger protein 162
11	AK013453	72815		RIKEN cDNA 2810489J07 gene
11	AF312033	70240	Tnfr	thyroid-stimulating hormone receptor trn-r; thyrotropin releasing thr
11	NM_013696	22045		cytochrome P450, family 4, subfamily v, polypeptide 3
11	AB0556437	102294	Cyp4v3	
11	Y08028	11875	Arl5	ADP-ribosyltransferase 5
11	AB041591			
11	NM_010801	17349	Mil1	myeloid/lymphoid leukemia factor mil1; hematopoietic lineage switch 7 hst7
11	NM_008283	15458	Hpyc2	Q300 Q300 protein aa 1-77
11	NM_008085			
11	AF439556			
11	NM_026319	67694		hypothetical protein FLJ22821 [Homo sapiens] 88 %
11	AK014834	70887		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921520P21 product:hypothetical Microbodies C-terminal targeting sign

FIGURE 2-7

cluster analysis I
colon cancer
midbrain

Cluster	Access	Locus	Gene	Description
11	NM_0254186	66320		RIKEN cDNA 1700006C06 [Mus musculus] 100 %
11	NM_0531188		Gpr50	G-protein-coupled receptor 50
11	NM_010340	14765	Chrm4	cholinergic receptor muscarinic 4 chrm4
11	NM_007699	12672	Ush1c	Usher syndrome 1C homolog (human)
11	AF228925	72088	Mcp1a	merp1 a alpha-subunit mcp-1
11	NM_008585	17287		RIKEN cDNA 1110034G24 gene
12	AK004090	73747		Mus musculus mRNA for CN 8 scf-v, complete cds
12	AB036341		Dpag2	dolichyl-phosphate alpha-n-acetylglucosaminophosphotransferase 2 dpag2
12	NM_007875	13478	Ccna1	cyclin a 1
12	NM_007628	12427		RIKEN cDNA 2310041H08 gene
12	NM_029385	75688		polymerase (DNA directed), alpha 1
12	NM_008892	18968	Pola1	RIKEN cDNA 2310016N21 [Mus musculus] 100 %
12	NM_023784	75581		potassium large conductance calcium-activated channel, subfamily M, alpha member 1
12	NM_010610	16531	Kcnma1	chondroin 4-sulfotransferase [Mus musculus] 47 %
12	AK004401	71797		-138487 tasin - human 51.90 %
12	AK021408	78733		undifferentiated hematopoietic stem/progenitor cells protein MDS031 [Homo sapiens] 86 %
12	AB041649		Srd5a2i	steroid 5 alpha-reductase 2-like; HSAR gene; steroid 5 alpha-reductase 2 like [Mus musculus] 100 %
12	NM_026247	67574	Nup210	nuclear pore membrane glycoprotein 210 pnp210
12	NM_020611	57357		13 days embryo slomech riken cDNA clone:d530014g21
12	NM_018615	54563		zinc finger protein 142
12	AK021287	78717	Zip142	secreted frizzled-related sequence protein 5
12	AK020384	77264	Sirp5	secreted frizzled-related factor 3
12	NM_018780	54612	Fgfr3	fibroblast growth factor 3
12	NM_008007	14174		melanocyte proliferating gene 1
12	AK017955	60315	Myg1	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, A
12	NM_021468	21339	Taf1a	casein delta
12	NM_009973	12992	Csmd	solute carrier family 39 (zinc transporter), member 4 [Homo sapiens] 39 %
12	AK007473	72002		pr-S34338 - S34338 biliary glycoprotein F - mouse 34 %
12	AK018613	71601		

Figure 2-8

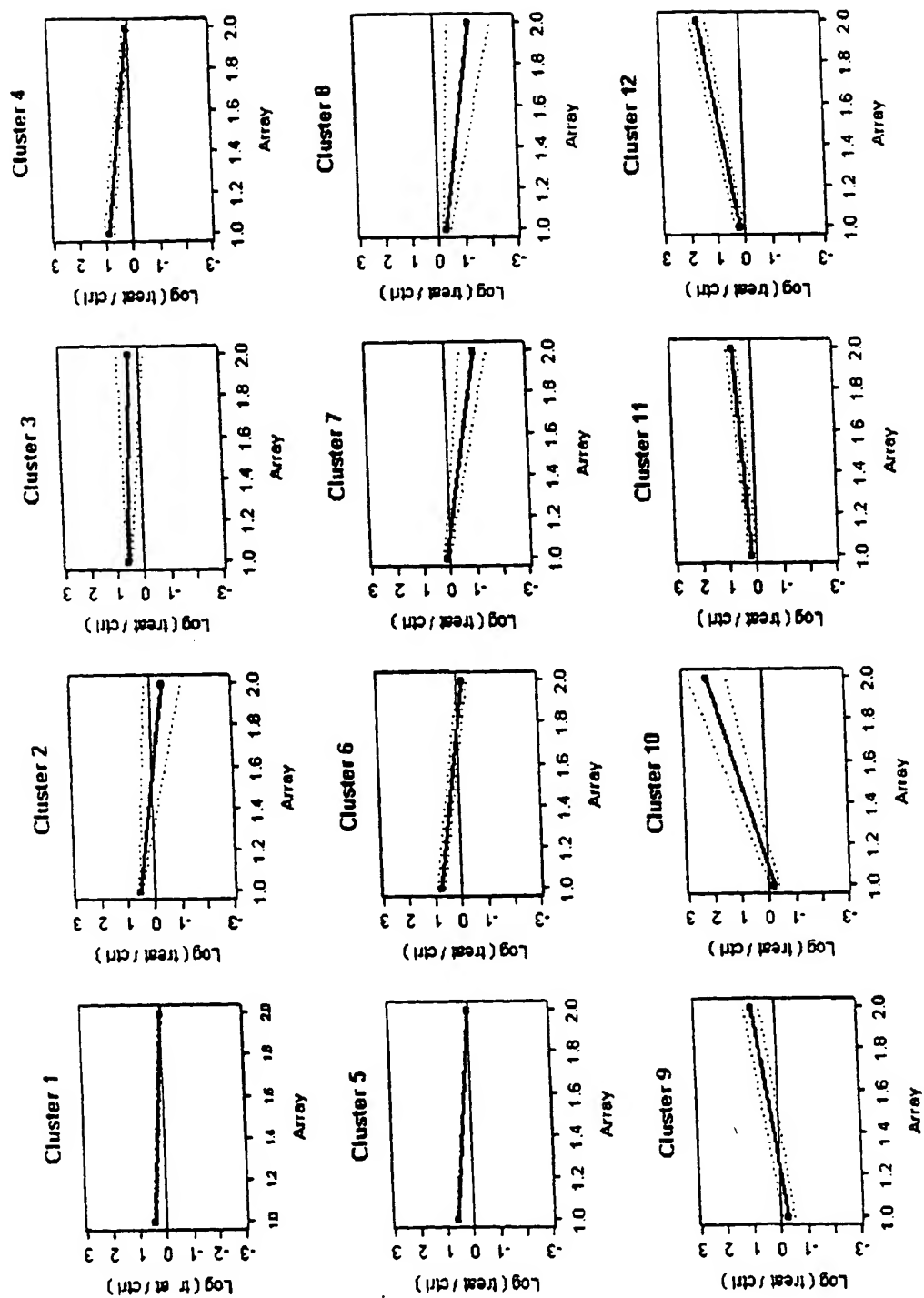


FIGURE 3-1

Cluster	Access	Locus	Gene	Description
1	AK017529	52447		DNA segment, Chr 8, ERATO Doi 633, expressed
1	NM_013728	27216	Olfir154	olfactory receptor 154
1	NM_013592	17183	Matn4	matrilin 4
1	NM_011505	20913	Stxbp4	syntaxin binding protein 4
2	NM_010351	14836	Gsc	goosecoid gsc
2	NM_026630	68236		Mus musculus RIKEN cDNA 2410116G06 gene (2410116G06Rik)
2	AK018149	70729	Capon	C-terminal PDZ domain ligand of neuronal nitric oxide synthase
2	NM_009814	12373	Casq2	calsequestrin 2
3	BC016549	72434	C4 4a	GPI-anchored metastasis-associated protein homolog
3	NM_007442	11695	Alx4	aristalless 4
3	NM_011148	19023	Ppel2	protein phosphatase, EF hand calcium-binding domain 2
3	NM_022024	63986	Gmfg	glia maturation factor, gamma
4	AK006565	78025	Shapy	Ca2+-dependent endoplasmic reticulum nucleoside diphosphatase
4	AK016707	74420		RIKEN cDNA 4933406P04 gene
4	NM_007986	14089	Fap	fibroblast activation protein
4	AK020460	77252		S12207 hypothetical protein (B2 element) - (80% mouse)
5	AK020617	66825		ref:NP_061935.1 - hypothetical protein FLJ20225 (Homo sapiens) 68 %
5	AK019946	78548		Mus musculus 6 days neonate head cDNA, RIKEN full-length enriched library, clone 5430417C01 product:hypothetical protein
6	NM_009757	12155	Bmp15	growth differentiation factor-9b gdf-9b, bone morphogenetic protein 15 bmp15
6	NM_010909	18038	Nikb1l	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
6	NM_008802	18583	Pde7a	phosphodiesterase 7A
6	NM_011203	19248	Pipn12	protein tyrosine phosphatase, non-receptor type 12
6	BC011108	71699		hypothetical protein FLJ20473 (Homo sapiens) 69 %
7	NM_021421	52477		DNA segment, Chr 1, ERATO Doi 396, expressed - RIKEN cDNA 2610307121: hypothetical protein, MNCb-4273 [Mus musculus] 100 %
7	NM_009434	22113	Tssc3	tumor-suppressing subchromosomal transferable fragment 3
8	AK014599	77042		Similar to CUB and Sushi multiple domains 1 (P4-20 hyaluronidase, zona pellucida binding) [45% Homo sapiens]
8	AK015672	74943		Similar to CUB and Sushi multiple domains 1 [74% Mus musculus]
8	L38178	20272	Scn7a	sodium channel, voltage-gated, type VI, alpha polypeptide
8	AK010800	76797		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
8	AK016497	70980		RIKEN cDNA 4931431F 19 gene
8	AK007667	69171		
9	AK011897	72495		RIKEN cDNA 2610206C17 gene
9	NM_011054	18575	Pde1c	phosphodiesterase 1C
10	NM_011881	24013	Rhod	rhodopsin kinase
10	NM_027170	69696		JC6547 high sulfur protein B2E - rat 37 %
11	NM_022028	64011	mrgn	neurogranin
11	NM_016849	54131	Irf3	interferon regulatory factor-3 Irf3 Irf-3: factor 3
11	AK005678	321010		RIKEN cDNA 1700006J14 gene
12	NM_025457	66268		cDNA 1810008A14 [Mus musculus]
12	NM_080638	78388	Mvp	major vault protein
12	NM_008720	18145	Npc1	niemann pick type c1

Figure 3-2

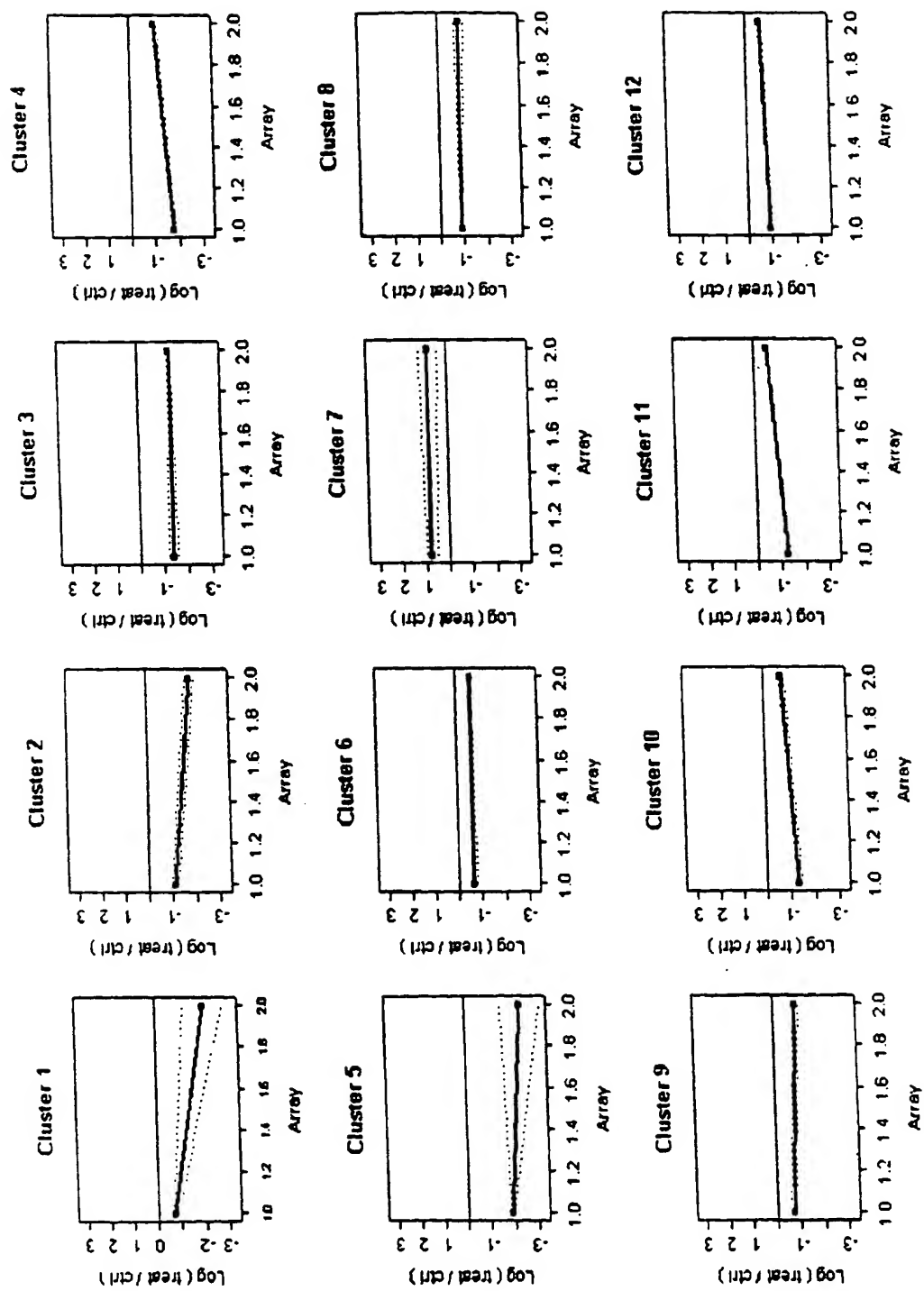


FIGURE 4-1

Cluster	Access	Locus	Gene	Description
1	L29479			
1	NM_053188			
1	NM_018779			
1	NM_019709			
1	NM_011135			
1	NM_024217	18983	Cnot7	catabolite repressor protein ccr4-associative factor cafi; ccr4-not transcription complex subunit 7 clone mgc:6050
1	AY033901	68936		ref:NP_478062.1 - chromosome 21 open reading frame 51 (Homo sapiens) 82 %
1	AK013131	69956		hypothetical protein FLJ20758 (73% human)
1	NM_023773	75339		adult male testis riken cdna clone:4930548g07: 4930548g07 4930548g07rik
1	NM_010788	17257	Meep2	methyl cpg binding protein 2
1	NM_022327	64143	Ralb	v-rat simian leukemia viral oncogene homolog B (ras related)
1	AK012967	76553		ENC1_MOUSE Ectoderm-neural cortex-1 protein (ENC-1) 80 % /
1	NM_016681	50883	Chek2	CHK2 checkpoint homolog (S. pombe)
1	AK006993	73486		RIKEN cDNA T700084J12 gene
1	AK016641			discs, large homolog 1 (Drosophila)
1	NM_007862	13383	Dlgh1	ORM1-like 3 (S. cerevisiae)
1	NM_025661	66612	Ormdl3	steroidogenic acute regulatory protein related clone mgc:6996
1	X12504			RIKEN cDNA 2410012H22 gene
1	NM_021547	59045	Min64	AFG3(ATPase family gene 3)-like 1 (yeast
1	AK010472	69747		
1	AK008844			
1	AK012394	114896	Afg311	ubiquitin-specific protease otubain 2 (94%)
1	NM_020563			
1	AK014242			
1	BC004639	68149		
1	NM_026580			
1	AF217002			
1	NM_021471			
1	NM_007744	12846	Comt	catechol-o-methyltransferase comt
1	NM_016766	51812	Mors1	microspherule protein clone mgc:5852; nucleolar msp58
1	AK006388			
1	NM_013562			
1	AK005168			
1	NM_009559	22715	Zfp57	zfp-57
1	NM_031373	72075	Ogfr	oploid growth factor receptor
1	AK018094	76157	Frd1	fr. fringe-like 1 (Drosophila)
1	NM_020025	26878	B3gal12	udp-gal:betaglcnac beta 13-galactosyltransferase polypeptide b3gal12
1	BC006905	75608		HSPC134 protein [60% Homo sapiens]
1	NM_008488	16650	Kpna6	karyopherin (importin) alpha 6
1	AK016803			sterol regulatory element binding protein srebp1; clone image:3590844
1	BC006051	20787	Srebf1	
1	AK008071			
1	NM_021405			
1	NM_030688			
1	NM_025980			
1	X13721			
1	NM_023805			
		15416	Hoxb8	homeo box B8

FIGURE 4-2

cluster analysis I
breast cancer
midbrain

Cluster	Access	Locus	Gene	Description
	1 NM_008930	19113	Pripe	prolactin-like protein E
	1 NM_011980	26465	Zfp146	zinc finger protein 146 zfp146
	1 NM_010877	17970	Ncf2	neutrophil cytosolic factor 2
	1 AK005138			
	1 AK016624			
	1 NM_013624	18419	Otog	otogelin mucin-like extracellular matrix protein mitemp
	1 NM_009096	20104	Rps6	ribosomal protein s6 rps6
	1 NM_019794			
	1 NM_030724			
	1 NC_001569	17722	mt-Nd6	Mus musculus mitochondrion, complete genome
	1 NM_019824	56378	Arpc3	actin related protein 2/3 complex, subunit 3
	1 AK010555	69746		RIKEN cDNA 2410019A14 gene
	1 NM_013696	22045	Thr	thyrotrophin-releasing hormone receptor trhr; thyrotropin releasing thr
	1 U56773			
	1 NM_008040			
	1 NM_026095	67332	Snrpd3	small nuclear ribonucleoprotein D3
	2 NM_021394			
	2 AK005865	71020		RIKEN cDNA 4933400B06 gene
	2 AK011853	72475	Ssbp3	single-stranded DNA binding protein 2; single-stranded-DNA-binding protein 2; hypothetical protein (83% human)
	2 AK010425			
	2 NM_010758	17136	Mag	myelin-associated glycoprotein mag exon 12: myelin associated-glycoprotein
	2 NM_008880	18828	Plscr2	phospholipid scramblase 2
	2 NM_026596	68175		Mus musculus RIKEN cDNA 4930591A17 gene (4930591A17Rik)
	2 NM_009124			
	2 AK014934	70887		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921520P21 product:hypothetical Microbodies C-
	2 NM_019945			
	2 NM_025826			
	2 L10319			
	2 AK012521			
	2 AK015207			
	2 NM_025774			
	2 AB039933			
	2 NM_009320	21366	Slc6a6	solute carrier family 6 neurotransmitter transporter taurine member slc6a6; mus cooki taurine/beta-alanine
	2 NM_052977	94191	Adar3	adenosine deaminase 3, RNA dependent
	2 NM_008493	16846	Lep	leptin
	2 NM_008971	19230	Plk9	PTK9 protein tyrosine kinase 9
	2 NM_009745			
	2 NM_019960			
	2 AK010337	74322	Cgbp	CpG binding protein
	2 S67967	16976	Lrpap1	AMRP_MOUSE Alpha-2-macroglobulin receptor-associated protein precursor (Alpha-2-MRAP) (Low density 98.72 %
	3 AK018071			
	3 AK004405	76651		adult male testis riken cdna clone:1700122o11
	3 AK007241			
	3 NM_023480			
	3 AB039178			
	3 NM_007951			
	3 NM_009846	12484	Cd24a	CD24a antigen

FIGURE 4-3

Cluster	Access	Locus	Gene	Description
3 BC003277 3 AK006598 3 NM_013496 3 AF220209 3 NM_007645 3 BC004079	3 BC003277	214359		hypothetical protein FLJ10199 [84% Homo sapiens]
	3 AK006598	73344		RIKEN cDNA 1700034J05 gene
	3 NM_013496	12903	Crabp1	cellular retinoic acid binding protein I
	3 AF220209	65113	N4wbp5	nedd4 ww domain-binding protein 5 n4wbp5
	3 NM_007645	12493	Cd37	leukocyte surface antigen cd37
3 NM_031402 3 NM_008297 3 NM_011225 3 AK005878 3 NM_016859	3 NM_031402	15500	Hsf2	heat shock factor hsf2
	3 NM_008297	19330	Rab18	ras-related protein rab18
	3 NM_011225			bystin-like
	3 AK005878	53414		
	3 NM_016859			solute carrier family 25 mitochondrial carrier ornithine transporter member 15 slc25a15
3 AK005902 3 NM_011017 3 AK006440 3 NM_008962 3 NM_080287	3 AK005902	18408	Slc25a15	RIKEN cDNA 1700027N10 gene
	3 NM_011017	75564		prostaglandin D receptor
	3 AK006440	19214	Plgdr	engulfment and cell motility 2, ced-12 homolog (C. elegans)
	3 NM_008962	140579	Elmo2	RIKEN cDNA 2410002O22 gene
	3 NM_080287	66975		RIKEN cDNA 8030491N06 gene
3 AK012141 3 AK020222 3 NM_016897 3 NM_008178 3 NM_007865	3 AK012141	77505	Timm23	translocase of inner mitochondrial membrane 23 homolog (yeast)
	3 AK020222	53600	Gsh1	homeobox gsh-1
	3 NM_016897	14842		delta-like protein
	3 NM_008178	13388	Dll1	
	3 NM_007865	72425		RAB3D, member RAS oncogene family 9
3 AK010654 3 NM_031874 3 AK019053 3 BC004776 3 AK017115	3 AK010654	19340	Rab3d	Mus musculus adult male stomach cDNA, RIKEN full-length enriched library, clone:2210018M05 product:midline 1
	3 NM_031874	Unknown		RIKEN cDNA 6330575P11 gene
	3 AK019053	233802		RIKEN cDNA 5730493B19 [62.07% Mus musculus]
	3 BC004776	74476	Zfp371	zinc finger protein 371
	3 AK017115	170734	Nlsr2	brain neurotensin receptor g-protein coupled
3 AF204778 3 NM_008747 3 NM_010370 3 NM_013818 3 NM_029199	3 AF204778	18217	Gzma	granzyme A
	3 NM_008747	14938		
	3 NM_010370			RIKEN cDNA 4930542N07 gene
	3 NM_013818	75185		paraxis basic-helix-loop-helix protein
	3 NM_029199	21407	Tcf15	adult male testis riken cdna clone:1700123d08
3 NM_009328 3 AK007246 3 AK016516 3 NM_013751 3 AK016461	3 NM_009328	76646		RIKEN cDNA 4931407K02 gene
	3 AK007246	77627	Hrasrs	hras suppressor expressed in skeletal muscle heart brain and bone marrow; 18 days embryo riken cdna clone:1190010i23
	3 AK016516	27281		leucine-rich and death domain containing; p53 protein induced, with death domain [Mus musculus] 40.00 %
	3 NM_013751			
	3 AK016461	70388		RIKEN cDNA 4933407G07 gene
3 AK008713 3 AB023957 3 AK016718 3 NM_008439 3 NM_009498	3 AK008713	71062		Ketohexokinase (Hepatic fructokinase)
	3 AB023957	16548	Khk	vesicle-associated membrane protein cellubrevin vamp/synaptobrevin homolog
	3 AK016718	22319	Vamp3	SYN1_MOUSE Synapsin I 30 %
	3 NM_008439	69539		
	3 NM_009498			histone deacetylase hdac7
3 AK009004 3 NM_031881 3 NM_019572 3 NM_007480 3 NM_013738	3 AK009004	56233	Hdac7a	adp-ribosylation factor 5 arf5
	3 NM_031881	11844	Arf5	
	3 NM_019572			gcn5 histone acetyltransferase; clone image:3491089
	3 NM_007480			
	3 NM_013738	14534	Gcn5l2	
3 NM_020004	3 NM_020004			

FIGURE 4-4

Cluster	Access	Locus	Gene	Description
3	S82853	101333	Cry11	expressed sequence AW123240
	AF071068			CRYL_HUMAN Lambda-crystallin homolog 83 %
	D64112			
	AK009770			
	NM_053201			
	NM_031182			
	BC004678			
	NM_009871			
	BC004074			
	AK020683			
3	AK019434	21909	Hox1111	T-cell leukemia, homeobox 2
	BC005625			
	NM_009392			
	NM_053258			
	NM_009048			
	BC005556			
	AK006258			
	NM_021302			
	AK009217			
	AK018581			
3	NM_017480	54167	Pke	PKE protein kinase, hypothetical serine/threonine protein kinase [Mus musculus] 100 %
	AK020613			KLKC_HUMAN Kalikrein 12 precursor (Kalikrein-like protein 5) (KLK-L5) 70 %
	AF343088			Inducible T-cell co-stimulator
	AB026497			S43344 sex-determining protein Sry - mouse (27 % M. musculus)
	AK018481			mypdz myosin containing pdz domain
	NM_009322			hypothetical protein FLJ20772 (79% human)
	AK004882			putative cerebral cortex transcriptional regulator t-brain-1 tbr-1 regulator t-box brain tes-56
	AF220135			tocopherol (alpha) transfer protein
	AK007760			tripartite motif protein 17
	AK021211			
4	BC003842	13807	Eno2	enolase 2 gamma neuronal eno2
	NM_013509			
	NM_030722			RIKEN cDNA 1700026D08 gene
	AK006375			
	NM_025746			rhoteikin
	NM_009106			expressed sequence AI604832
	BC002294			keratin complex 2, gene 6g [Mus musculus] 100 %
	NM_019956			multiple PDZ domain protein
	NM_010820			
	Z67747			Tax interaction protein 1 [Homo sapiens] 99 %
4	AK004963	76281	Pla2g10 Isir	hepatocellular carcinoma-associated antigen 112 [55% Homo sapiens]
	AK002546			phospholipase A2, group X
	AF210429			immunoglobulin superfamily containing leucine-rich repeat
	NM_012043			RIKEN cDNA 5830411J07 gene
	NM_029082			
	AK016622			
	BC002120			

FIGURE 4-5

Cluster	Access	Locus	Gene	Description
4 AK016374				
4 NM_022813				
4 NM_008369		16188	IL3ra	il-3 receptor alpha subunit
4 NM_013867				
4 AK016436				
4 NM_013456		11474	Actn3	actinin alpha 3
4 AK016216				
4 AK005952		69380		RIKEN cDNA 1700013G24 gene
4 AK020067		68148		Mus musculus 13 days embryo male testis cDNA, RIKEN full-length enriched library, clone:6030449J20 product:hypothetical prot
4 NM_010377		14957	H1f3	histone h1f1 hist putative; testicular h1
4 AK015845				
4 NM_021520		59023	Slc28a2	purine-selective na+ nucleoside cotransporter cnt2 cnt2 spnt cif n1
4 NM_030703				
4 AK013485				
4 U16162		18451	P4ha1	proyl 4-hydroxylase alpha-subunit
4 NM_009516		22390	Wee1	wee 1 homolog (S. pombe)
5 AK016155		75271		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930557A04 product:hypothetical Histone-fold st
5 NM_023737				
5 NM_026631		78081		RIKEN cDNA 9230112K08 gene
5 AK020340		69186		RIKEN cDNA 1810027O10 gene
5 AK007623		71752		Similar to A58465 transcription factor IIC2 beta chain - human 88 %
5 AK004895				
5 NM_018873			Tacr2	tachykinin receptor 2 tacr2
5 NM_009314		21337		S50853 translation releasing factor eRF-1 (99% human)
5 BC013717		225363		Ellis van Creveld gene homolog (human)
5 NM_021292		59056	Evc	A55253 melanoma antigen MART-1 (67% human)
5 AK020928		77836		cytochrome P450, family 11, subfamily b, polypeptide 2
5 NM_009991		13072	Cyp11b2	
5 AF127033				RU2A_HUMAN U2 small nuclear ribonucleoprotein A (U2 snRNP-A) 32 %
5 AK016859		71156		methionine aminopeptidase-like 1
5 NM_025633		66559	Metap1	amiloride binding protein 1 (amine oxidase, copper-containing)
5 AK005423		76507	Abp1	CDC42 effector protein (Rho GTPase binding) 4
5 NM_020006		56699	Cdc42ep4	RIKEN cDNA 4933405D12 gene
5 AK016661		74057		Similar to ROSIT [54% Rattus norvegicus]
5 AK014544		74338		
5 AK005345				
5 AK015708				
5 AK010791		76792		hypothetical protein FLJ21415 (93% human)
5 AB049637		78523	Mrp19	mrp19 mitochondrial ribosomal protein l9 l9mt
5 NM_021328				
5 D50416				
5 NM_019512		20474	Six4	transcription elongation regulator 1 (CA150)
5 AK017626		56070	Tcerg1	uncharacterized bone marrow protein BM033 [85.88% Homo sapiens]
5 AK019545		70544		hypothetical protein FLJ20156 [Homo sapiens] 28 %
5 BC012255		78257		RIKEN cDNA 6720465F12 gene
5 NM_021713		77891		
5 NM_025840				

FIGURE 4-6

Description ethanol incubated 2 [putative ribonuclease III; putative protein p241 which interacts with transcription factor Sp1 [Hom 99 %]

Cluster	Access	Locus	Gene	Description
5 AK003651	14000	Elohi2		ethanol incubated 2 [putative ribonuclease III; putative protein p241 which interacts with transcription factor Sp1 [Hom 99 %]
5 BC004835	236519			hypothetical protein FLJ12806 [Homo sapiens] 97 % / 305 aa
5 NM_010504	15967	Ilina4		interferon alpha family, gene 4
5 AK005616	75435			adult male testis riken cdna clone:1700001o02
5 NM_007411	78807			RIKEN cDNA 4930544L04 gene
5 AK014696				
6 NM_023502	68214			A Chain A, Glutathione Transferase (62% human)
6 AK018953				
6 NM_023154	56517	Slc22a9		solute carrier family 22 (organic cation transporter), member 9
6 NM_019723				
6 NM_025325				Mus musculus odorant receptor M15 gene
6 AF282300	16667	Krt11-17		keratin complex 1, acidic, gene 17
6 NM_010663				
6 AK006287	20203	S100b		S100 protein, beta polypeptide, neural
6 NM_009115	12359	Cas1		catalase
6 NM_009804	18686	Phxr1		per-hexamer repeat gene 1
6 NM_011080				
6 AK016590	15364	Hmga2		high mobility group protein i isoform c hmga2
6 NM_010441	22666	Zfp161		zinc finger protein
6 NM_009547	76983			Similar to vesicle transport-related protein [95% Homo sapiens]
6 AK014070				
6 NM_007983	16485	Kcna1		intronless potassium channel mk1
6 NM_010595				
6 NM_021384	20296	Ccl2		chemokine (C-C motif) ligand 2
6 NM_011333				
6 D29987				
6 AK016572	20445	Siat7a		galnac alpha-26-sialyltransferase i
6 NM_011371				
6 AK007262				
6 NM_016894				
6 AK008111	64290	Foxb1		winged-helix protein twb transcription factor; forkhead box b1b foxb1b
6 NM_022378	192196			CGI-74 protein; CGI-59 protein [Homo sapiens] 98 %
6 AF318301	11444	Chmb2		cholinergic receptor, nicotinic, beta polypeptide 2 (neuronal)
6 NM_009602	74592			RIKEN cDNA 483342810 gene
6 AK014772				
6 NM_026187	50754	Fbxw7		F-box and WD-40 domain protein 7, archipelago homolog
6 NM_080428	57749	Pwili1		miwi piwi
6 NM_021311	70802	Hpcd		DM3A_MOUSE DNA (cytosine-5)-methyltransferase 3A (Dnmt3a) (DNA methyltransferase Mmullia) (DNA MTase 30 %
6 AK014534	58794			2-hydroxyphenyl-CoA lyase
6 NM_019975	22178	Tyrlp1		tyrosinase related protein tyrlp1
6 NM_031202				
6 NM_026125	21968	Tom1		target of myb1 homolog (chicken)
6 NM_011622	74415			dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 2 isoform 2 [99% Homo sapiens]
6 AK016565	232333	Gabtl		gamma-aminobutyric acid (GABA-A) transporter
6 L32178	50762	Fbxo6b		F-box only protein 6b
6 NM_015797				

FIGURE 4-7

Cluster	Access	Locus	Gene	Description
	6 NM_029963	77721	Mrps5	mitochondrial ribosomal protein S5
	6 AK010310			
	6 NM_008126	14620	Gjb3	connexin31
	6 NM_008899	18992	Pou3f2	POU domain, class 3, transcription factor 2
	6 NM_016864	53404	Atoh7	atoh7 homolog 7 (Drosophila)
	6 NM_008659	17913	Myo1c	myosin IC
	6 NM_052993			
	6 NM_008425	16518	Kcni2	potassium inwardly-rectifying channel, subfamily J, member 2
	6 AK005786	69347		RIKEN cDNA 1700129C05 [Mus musculus] 41 %
	6 NM_025529			
	6 NM_016912	53886	Cdkl2	cyclin-dependent kinase-like 2 (CDC2-related kinase)
	6 NM_026645			
	6 BC003372			
	6 NM_023243	66671	Ccnh	cyclin h ccnh regulatory subunit of cdk7 partner cdk7 in cak and tfiih
	6 AK006275	224671		BTB (POZ) domain containing 1 [Homo sapiens] 26.88 %
	6 AK006092			
	6 AK012711	66898		insulin receptor tyrosine kinase substrate (90% human)
	6 AK0004918			
	6 AF146593	29809	Hhl	expressed in hematopoietic cells, heart, liver
	6 NM_013862	76895	Bicd2	adult male kidney riken cdna clone:0610027d24
	6 AK002683			
	6 NM_008191			
	6 AK020491	77297		12 days embryo embryonic body between diaphragm region and neck riken cdna clone:9430077c05
	6 NM_023380	67742	Samsn1	SSN1_MOUSE SAM-domain protein SAMSIN-1 (SAM domain, SH3 domain and nuclear localisation signals prote 100 %
	6 AK014735	67392		RIKEN cDNA 4833420G17 gene
	6 NM_053115	93732	Acox2	acyl-Coenzyme A oxidase 2, branched chain
	6 NM_026175	67465	Sf3a1	splicing factor 3a, subunit 1 RIKEN cDNA 1200014H24 [Mus musculus] 100 %
	6 NM_023893			
	6 AK004768	71720	Osbpl3	oxysterol binding protein-like 3
	6 BC004690			
	6 NM_010745	17084	Ly86	lymphocyte antigen 86
	6 NM_007804	13048	Cull2	cut drosophila-like 2 cull2
	6 NM_007485			
	6 NM_013898	30058	Timm8a	translocase of inner mitochondrial membrane 8 homolog a yeast clone mgc:6730; timm8a
	6 AK014447			
	7 NM_019541			
	7 NM_010191	14137	Fdft1	squalene synthase
	7 BC003476	16149	li	ii ia antigen-associated invariant chains ii31 and ii41 exons - 8 protein; clone mgc:6517
	7 AK007368			
	7 NM_009761	12177	Bnip3l	BCL2/adenovirus E1B 19kDa-interacting protein 3-like
	7 AK009517	75580		zinc finger protein 295 (32% human)
	7 L26164			
	7 NM_026218	67529		RIKEN cDNA 1500031J01 gene
	7 NM_011446	20680	Sox7	sry-box containing 7 sox7
	7 NM_010797	17318	Mld1	midline 1
	7 NM_025597			
	7 NM_010412	15184	Hdac5	histone deacetylase 5 hdac5 class ii

FIGURE 4-8

cluster analysis I
breast cancer
midbrain

Cluster	Access	Locus	Gene	Description
	7 NM_015819	18968 55950 22589 66402 13406 16189 269846	Pola1	polymerase (DNA directed), alpha 1
	7 NM_008892		Bri3	i3 protein
	7 NM_018772		Xnp	atrx protein putative atpase and helicase
	7 NM_009530		Sln	sarcoplipin
	7 NM_025540		Dmp1	dentin matrix protein 1
	7 AJ242625		Il4	interleukin 4
	7 NM_021283			
	7 AK004845			lcr beta locus from bases 250554 to 501917 section 2 of 3 the
	7 AE000664			
	7 NM_019629			
	7 NM_025389	14924 75110 70573	Baiap1	BAI1-associated protein 1
	7 AF027505			L1 repeat, Tf subfamily, member 29 [69% Mus musculus]
	7 NM_023697			
	7 AK015778			
	7 NM_010016			
	7 NM_053156			hypothetical protein FLJ10560 [82.88Homo sapiens]
	7 AK017705			
	7 NM_021493		Ppp1cc	protein phosphatase 1, catalytic subunit, gamma isoform
	7 NM_013636			nuclear localization signals binding protein 1 (Mus musculus 79 %)
	7 AK004793			
	7 BC003852	11847 13370 76820 54120	Arg2	arginase type II
	7 NM_009705			
	7 AK017416		Dio1	adult male kidney riken cdna clone:0610011120; deiodinase iodothyronine type i dio1
	7 NM_007860			RIKEN cDNA 2410157M17 gene
	7 AK010821		Semcap2	semaF cytoplasmic domain associated protein 2
	7 NM_016867			
	7 BC004761			
	7 AK021330		Preb	prolactin regulatory element binding
	7 NM_016703			
	7 AK013879			
	7 AK014638	Unknown 54651 79196	Usp27x	10 days neonate skin riken cdna clone:4733401123
	7 AF229643		Osbp5	ubiquitin specific protease 27, X chromosome
	7 NM_024289			oxysterol binding protein-like 5
	7 AK007061			
	7 NM_008217		Has3	hyaluronan synthase 3 has3
	7 AK004110			Similar to T14765 hypothetical protein DKFZp434N014.1 - human (fragment) 95 %
	7 NM_007935		Msn	moesin
	7 NM_010833			
	7 NM_011304		Mafk	v-maf musculoaponeurotic fibrosarcoma oncogene family protein k avian mafk; erythroid transcription factor nf-e2 subunit
	7 NM_010757			RIKEN cDNA 4921517D21 gene
	7 NM_026338	17135 67722 15496 56086 56409 11861	Cyp2u1	cytochrome P450, family 2, subfamily u, polypeptide
	7 AK018458		Hsd3b5	hydroxysteroid dehydrogenase-5, delta<5>-3-beta
	7 NM_008295		Set	SET translocation [Mus musculus] 100 %
	7 NM_023871		Nud13	nudix (nucleotide diphosphate linked moiety X)-type motif 3
	7 NM_019837		Ar14	ADP-ribosylation-like 4
	7 NM_007487			
	7 NM_007725			

FIGURE 4-9

Cluster	Access	Locus	Gene	Description
7	AK016267	67629	Rbpsi1	RIKEN cDNA 2410030K01 gene
	AK011728	19668		recombinant binding protein suppressor of hairless-like (Drosophila)
	NM_009036			
	NM_019701	68045		CGI-99 protein [Homo sapiens] 97 %
	NM_026528	67344		RIKEN cDNA 1700055O19
	NM_026100			
	BC005563	114875		phospholipase C, zeta 1
	AK005949	72057		PHD zinc finger protein XAP135, isoform a [Homo sapiens] 96 %
	NM_024250			
	NM_023219			transgene insert site 737, insertional mutation, polycystic kidney disease
8	NM_009376	21821	Plcz1	transgene insert site 737, insertional mutation, polycystic kidney disease
	AK003981			
	AK008590	72090		Similar to ENP1_HUMAN Ectonucleoside triphosphate diphosphohydrolase 1 (NTPDase1) (Ecto-ATP diphosphohydrolase) 44%
	NM_019944	15285		homeodomain protein hb9
	AF317552	108062		cleavage stimulation factor, 3 pre-RNA subunit 2
	NM_010317	14706		guanine nucleotide binding protein (G protein), gamma 4 subunit
	NM_007814	13090		cytochrome p450 2b19 cyp2b19
	BC004630	216549		hypothetical protein FLJ20080 [Homo sapiens] 78.35 %
	NM_007423	11576		alpha fetoprotein
	NM_019775	56373		carboxypeptidase B2 (plasma)
8	AF176521	50789	Cpb2	F-box and leucine-rich repeat protein 3a
	AK016803	71056		HSF4_MOUSE Heat shock factor protein 4 (HSF 4) (Heat shock transcription factor 4) (HSTF 4) (mHSF4) 33 %
	AF167573	27374		Jak-binding protein 1
	NM_024472	79554		putative glycolipid transfer protein (25% human)
	AK005253	12768		chemokine (C-C motif) receptor 1
	NM_009912	74182		RIKEN cDNA 2310032D16 gene
	AK009137	26395		mitogen activated protein kinase kinase 1
	NM_008927			
	AK009704			
	AF435852	11426		microtubule-actin crosslinking factor macf macf cytoskeletal protein drosophila kakapo acf7
8	AF150755	18025	Adp7	nuclear factor, erythroid derived 2, like 3
	NM_010903	73166		RIKEN cDNA 3110041O18 gene
	BC014769	15980		interferon gamma receptor 2
	NM_008338	12267		anaphylatoxin c3a receptor mc3ar g protein-coupled receptor binds and responds to: complement component 3a c3ar1
	NM_009779	16392		ISL1 transcription factor, LIM/homeodomain (islet 1)
	NM_021459	30942		hepatocyte nuclear factor gamma
	NM_013920			
	AK005864	66171		6-phosphogluconolactonase
	NM_025396	14261		flavin containing monooxygenase 1
	NM_010231	56452		origin recognition complex subunit orc6
8	NM_019716	73707	Orc6	157963 natriuretic peptide receptor A - mouse 50.36 %
	AK010727			
	AK014545			
	BC006045	18566		programmed cell death pdc1
	NM_008798	73246		Ras association (RalGDS/AF-6) domain family 6
	AK005472	56807		secretory carrier membrane protein 5 scamp5
	NM_020270			

FIGURE 4-10

cluster analysis I
breast cancer
midbrain

Cluster	Access	Locus	Gene	Description
	8 NM_016736	72748		hypothetical protein MGC12904 [77% Homo sapiens]
	8 NM_019477			
	8 AK013245			
	8 BC017532			
	8 AK021306	78581		Mus musculus 13 days embryo stomach cDNA, RIKEN full-length enriched library, clone:D530033C11 product:hypothetical Domi
	8 AK006525			
	8 AK004107			
	8 AK002569			
	8 BC017636			
	8 NM_031873		83770	Tas1r2
8 NM_011359	Sftpc	surfactant associated protein C		
8 NM_019656	Tm4sf6	transmembrane 4 superfamily member 6 clone mgc:5801; tm4sf8		
8 NM_011429				
8 NM_008737	Nrp	neuropilin		
8 NM_011693	Vcam1	vascular adhesion cell molecule-1 vcam1 exon 10		
	8 NM_025705	18186		
	8 AF293079			
	8 NM_009864		Olfir8	olfactory receptor 6
	8 NM_017383		Cdh1	e-cadherin uvomorulin l-cam cell-cam 120/80 arc-1 precursor aa -156 to 884; cadherin cdh1
	8 AK007552		Cnln6	contactin 6 - neural recognition molecule NB-3 [Mus musculus] 100 %
	8 Z38011		Ccnl2	cyclin L2
	8 NM_022408	27886	Dm9	dystrophia myotonica linked gene,
	8 NM_009783		Es2el	expressed sequence 2 embryonic lethal - Es2 protein; DNA segment, Chr 16, human D22S1269E, expressed [Mus musculus] 10
	8 NM_011128			
	8 AK013874			
	8 NM_015760	50490	Nox4	NADPH oxidase 4
	8 NM_008989		Pura	purine rich element binding protein a
	8 AF242377			Z208_HUMAN Zinc finger protein 208 53 %
	9 AK014579	19217		
	9 NM_008964		Ptger2	prostaglandin e receptor ep2 subtype
	9 NM_016716			
	9 AK015936	11546		
	9 NM_053186			
	9 NM_008292			
	9 NM_009632		Adprt2	adp-ribosyltransferase nad+ poly adp-ribose polymerase adprt2; 2 parp2 parp-1-like protein parp-2
9 NM_011835	Katna1		lipotransin hormone-sensitive lipase hsl-interacting protein	
9 AK018361			RIKEN cDNA 7420700M05 gene	
9 NM_009802	12353	Car6	carbonic anhydrase 6	
9 NM_016753		Lxn	latexin lxn	
9 NM_017377				
9 NM_012035	26946	Trp8	receptor-activated calcium channel trp7 drosophila transient receptor potential protein	
9 NM_023587				
9 NM_053224				
9 NM_026249	67576		RIKEN cDNA 4930429B21 gene	
9 NM_025982				
9 AB045323			T42372 probable guanylate kinase (EC 2.7.4.8) 1, membrane-associated, splice form b - mouse 44 %	
9 AK012019	52357	N6amt1	putative N6-DNA-methyltransferase	
	67768			

FIGURE 4-11

cluster analysis I
breast cancer
midbrain

Cluster	Access	Locus	Gene	Description
9 NM_021427	58237			hypothetical protein, MNCb-123; hypothetical protein, MNCb-1231 [100% Mus musculus]
9 NM_023884	71421			6 days neonate head riken cdna clone:5430427o21
9 AK017352	74665			RIKEN cDNA 4930449E07 gene
9 AK015430	16204		Fabp6	fatty acid binding protein 6, ileal (gastrotrophin)
9 AK007964	66060			putative nuclear protein ORF1-FL49 [Homo sapiens] 89.42
9 NM_008375	68631		Cry1l	crystallin, lamda 1
9 NM_018819	58459		Uble1a	ubiquitin-like 1 (sentrin) activating enzyme E1A
9 NM_030004	55981		Pigb	phosphatidylinositol glycan class b
9 NM_019748	56070		Tcerg1	transcription elongation regulator 1 (CA150)
9 NM_018889	27413		Abcb11	ATP-binding cassette, sub-family B (MDR/TAP), member 11
9 AK017726	68792			sushi-repeat protein [Homo sapiens] 93 %
9 NM_019512				
9 NM_021022				
9 AK004171				
9 NM_009047				
9 AK018155				
9 NM_011720				
9 BC018324				
9 NM_009627	11535		Adm	preproadrenomedullin; adrenomedullin adm
9 BC004655	103468			A54142 nucleoporin NUP107 - 95.69% rat
9 NM_009215	20604		Smsl	preprosomatostatin
9 BC005753	210148		Slc30a6	solute carrier family 30 (zinc transporter), member 6
9 NM_010811	17423		Nds12	glucosaminyl n-deacetylase / n-sulfotransferase dual enzyme activities; heparan sulfate n-deacetylase/n-sulfotransferase
9 NM_023908				
9 AK019579	78924		Htr1b	ref:NP_038605.1 - L1 repeat, Tr subfamily, member 30 [Mus musculus] 77.97 %
9 NM_010482	15551			5-hydroxytryptamine (serotonin) receptor 1B
9 BC002151				
9 NM_010200				
9 AK007787				
9 AK014093				
9 NM_026504	52064			DNA segment, Chr 5, ERATO Doi 33, expressed
9 AK008151	70114			FRIH_MOUSE Ferritin heavy chain (Ferritin H subunit) 41 %
9 NM_017471				
9 AK014939	70885			hypothetical protein FLJ10569 [100% human]
9 AK015898				
9 AK003253	73731			RIKEN cDNA 1110001M24 gene
9 NM_009060	19733		Rgn	regucalcin
10 AK014128	207615			T46442 hypothetical protein DKFZp434F2427.1 - (96.57% human)
10 NM_024291				
10 NM_025462				
10 NM_008177	14829		Grpr	gastrin releasing peptide receptor grpr
10 NM_007564	12192		Zfp361	zinc finger protein 36, C3H type-like 1
10 AK016695				
10 NM_011300	20115		Rps7	ribosomal protein s7 clone mgc:5812
10 NM_010145	13849		Ephx1	epoxide hydrolase 1, microsomal
10 AK019535				

FIGURE 4-12

Cluster	Access	Locus	Gene	Description
10 AK009957	69692			CGI-130 protein [71% Homo sapiens]
10 NM_007881	13498		Dp1a	dentatorubral pallidolysian atrophy
10 AK017713	70584		Pak4	p21 (CDKN1A)-activated kinase 4
10 AK008069	69870			RIKEN cDNA 2010003119 gene
10 AK007167				
10 AK010201	69687		Obox1	CGI-127: yippee protein [100% Human]
10 AK018362	71468			oocyte specific homeobox 1
10 NM_021306	13599		Ecel1	dine metalloproteinase damage-induced neuronal endopeptidase
10 AK005692	71830			Similar to ISHUS protein disulfide-isomerase (EC 5.3.4.1) precursor - human 31 %
10 AJ130977	23806		Arih1	Ariadne protein
10 AK008013				
10 BC002098	226591			RIKEN cDNA 1810011K17 gene
10 NM_020279	56838		Scya28	small inducible cytokine a28 scya28
10 NM_031387				
10 AK006800	74270		Usp20	ubiquitin specific protease 20
10 NM_008929	19107		Dnajc3	DnaJ (Hsp40) homolog, subfamily C, member 3
10 AB016248	235293		Sc5d	sterol-c5-desaturase
10 NM_008428	16523		Kcnj8	potassium inwardly-rectifying channel, subfamily J, member 8
10 NM_011888	24047		Ccl19	chemokine (C-C motif) ligand 19
10 AB047323				Mus musculus gene for Cox17p, complete cds
10 NM_008696	26921		Map4k4	mitogen-activated protein kinase kinase kinase 4
10 AK012994	72181			RIKEN cDNA 2810405F18 gene
10 AK016319	75913			Similar to apoptotic chromatin condensation inducer in the nucleus [93% Mus musculus]
10 NM_009453	22184		U2af1-rs2	U2 small nuclear ribonucleoprotein auxiliary factor (U2AF), related sequence 2
10 AK020831	77794			T00260 hypothetical protein KIAA0605 - human 97 %
10 BC005672	230784		Ses2	sestrin 2
10 AF317517	77889		Lbh	limb-bud and heart
10 U89915	16456		F11r	F-11 receptor
10 AK015245	74626			RIKEN cDNA 4930429O20 gene
10 NM_010879	17974		Nck2	non-catalytic region of tyrosine kinase adaptor protein 2
10 NM_016719	50915		Grb14	growth factor receptor bound protein 14
10 AB006034	13115		Cyp40	25-hydroxyvitamin d3 1alpha-hydroxylase
10 AK010153				
10 AK002371				
10 NM_020515	57272		Ora16	gene for odorant receptor A16
10 NM_010783				
10 BC004027				
10 NM_013680	20964		Syn1	synapsin Ib syni synaptic vesicle associated protein
10 AK014178				
10 NM_023162	86138			RIKEN cDNA 1110014N07 gene, nuclear RNA polymerase I small specific subunit [Mus musculus] 100 %
10 AK016792				
10 NM_015734	12831		Col5a1	collagen a1v
10 NM_026583				
10 NM_026167				
10 AK018093				
10 NM_007863				
10 AK016069				

FIGURE 4-13

cluster analysis I
breast cancer
midbrain

Cluster	Access	Locus	Gene	Description
10 BC003217				
10 NM_016709				
10 NM_025476		66302		RIKEN cDNA 2410005016 gene
10 BC003808				similar to hypothetical protein [Mus musculus]
10 NM_008548		17155	Man1a	mannosidase alpha man1a
10 NM_008493		22310	V2r4	vomerionasal 2, receptor, 4
10 AK004206		67282		AD16_HUMAN Protein AD-016 (Protein CGI-116) (x0009) 90 % /
10 AK015243		252876		hypothetical protein FLJ20125 [83% Homo sapiens]
10 NM_052975				
10 NM_008036		14282	Fosb	nsp-like 1 protein nsp1 lma-sec and fosb; aa 1-338
10 AK017598				
10 NM_021456				
10 NM_017463		18515	Pbx2	pre b-cell leukemia transcription factor 2 pbx2
10 NM_010289		14610	Gja10	gap junction membrane channel protein alpha 10
10 K00083		15978	l1ng	interferon-gamma (mu1fn-gamma)
10 AK005661				
10 NM_009962		14764	Gpr44	putative g-protein coupled receptor crth2
10 NM_008078				
10 NM_009672		11737	Anp32	cerebellar leucine rich acidic nuclear protein lanp phosphoprotein 32 mpp32 encoded by genbank accession number u734; anp3;
10 NM_009004		19348	Rab6kifl	rabkinesin-6
10 NM_028785		74146		RIKEN cDNA 1200017A24 gene
10 NM_013603		17751	MI3	metallothionein 3
10 NM_011829		23917	Impdh1	inosine 5-phosphate dehydrogenase 1
10 BC005624				
10 NM_030717		80907	Lactb	serine beta lactamase-like protein lact-1
10 AK011064		70235		DKFZP434C245 protein [Homo sapiens] 90 %
10 NM_013415		11932	Atp1b2	atpase na+/k+ transporting beta 2 polypeptide
10 AK007097				
10 AK003217				
10 NM_013459				
10 BC006600		60321	Wbp11	WW domain binding protein 11
10 AK013927				
10 NM_008508				
10 AF440737				
10 AK003496		73833		T08675 hypothetical protein DKFZp564F0522.1 - human (fragment) 49 %
11 AK011036		66230	Mrrps28	mitochondrial ribosomal protein S28
11 AK016041				
11 NM_015818		50785	Hs6st1	heparan sulfate 6-O-sulfotransferase 1
11 AK009303				
11 AK006173				
11 NM_028717		74018	Als2	amyotrophic lateral sclerosis 2 (juvenile) homolog (human)
11 NM_010908				
11 U69898		21856	Timm44	translocase of inner mitochondrial membrane tim44 nuclear encoding protein precursor form has size 50 kd mature
11 AY044265		235339	Dlat	dihydrolipoamide S-acetyltransferase (E2 component of pyruvate dehydrogenase complex)
11 NM_020611		57357	Srd5a2l	teroid 5 alpha-reductase 2-like; H5AR gene; steroid 5 alpha-reductase 2 like [Mus musculus] 100 %
11 AK008356				
11 AK006446		69468		adult male testis riken cdna clone:1700028b15

FIGURE 4-14

Cluster	Access	Locus	Gene	Description
11	NM_028333			
11	NM_008896			
11	M26156	14990	H2-M2	histocompatibility 2, M region locus 2
11	U56650	18232	Nxph2	neurexophilin 2
11	NM_016739	53872	Gplap1	GPI-anchored membrane protein 1
11	AK007195	76640		RIKEN cDNA 1700113H08 gene
11	AF251267	64452	Slc5a4a	solute carrier family 5, member 4a
11	NM_008258	15374	Hnl	hematological and neurological expressed sequence 1
11	BC012973	22242	Umod	uromodulin
11	AK014396	74020	Cpne4	copine IV
11	AK005756			
11	NM_009055	19724	Rfx1	vregulatory factor X, 1 (influences HLA class II expression)
11	NM_008602	17344	Miz1	Msx-interacting-zinc finger
11	BC006025	21833	Thra	clone image:3488596
11	NM_019458	54624		hypothetical protein F23149_1(97% human)
11	AK014309			
11	NM_019659	56379	Kcnj1	potassium inwardly-rectifying channel subfamily j member knj1
11	NM_011244	19411	Rarg	retinoic acid receptor gamma mrar-gamma-a
11	D63902	22660	Trim25	estrogen-responsive finger protein; clone mgc:6886
11	AK014877	70923		RIKEN cDNA 4921513D11 gene
11	NM_033622	24099	Trisf13b	tumor necrosis factor (ligand) superfamily, member 13b
11	AK018430			
11	NM_023732	74104	Abcb6	adult male lung riken cdna clone:1200005b17
11	AK016099	67657	Rab3	RAB, member of RAS oncogene family-like 3
11	BC008225			
11	NM_008692	18046	Nfyc	nuclear transcription factor-y gamma nfyc; factor yc
11	AK009010			
11	NM_009860			
11	AK014865	12532	Cdc25c	cell division cycle 25 homolog c.s. Cerevisiae
11	NM_019718	66722		hypothetical protein FLJ22724 [Homo sapiens] 68 %
11	NM_021466			
11	NM_019453	21339	Taf1a	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, A
11	AK011446	70348		Similar to hypothetical protein DKFZp434A1520.1 [70% Human]
11	NM_025677	66637		cDNA 5730449L18 [Mus musculus]
11	AK011541			
11	AK014397	70775		Similar to transcription factor ATBF1 [25% Mus musculus]
11	NM_018736	17535	Mre11a	meiotic recombination 11 homolog A (S. cerevisiae)
11	NM_013813	13823	Epb4.1i3	erythrocyte protein band 4.1-like 3
11	NM_023912	78891	Scyl1	SCY1-like 1
11	NM_008081	14422	Galgt2	udp-n-acetyl-alpha-d-galactosamine:n-acetylneuraminy-galactosyl- n-acetylglucosaminylpolypeptide-bela-1 4-n-acetylgalactosar
11	AF187073	27426	Nagpa	N-acetylglucosamine-1-phosphodiester alpha-N-acetylglucosaminidase
11	NM_007803	13043	Citin	cortactin citn
11	NM_008055	14366	Fzd4	fizzled homolog 4 drosophila fzd4
11	NM_026330	67711		RIKEN cDNA 2510027N19 [Mus musculus]
11	NM_021342	57814	Kcne4	potassium voltage-gated channel isk-related subfamily kcne4
11	AK016064	70891		RIKEN cDNA 4921517J08 gene
11	AK009780			

FIGURE 4-15

cluster analysis I
breast cancer
midbrain

Cluster	Access	Locus	Gene	Description
11 AK017913				
11 AK021021				
11 NM_020520		57279	Slc25a20	solute carrier family 25 (mitochondrial carnitine/acylcarnitine translocase), member 20
11 AK006096		76574		
11 AB047820				
11 NM_013490		12660	Chk	choline kinase
12 NM_010896		18014	Neurod3	neurogenic differentiation 3 neurod3
12 AK012283		72569		RIKEN cDNA 2700023J09 gene
12 AK009012		71884	Chil1	chitinase 1 (chitotriosidase)
12 AF162224		30924	Angptl3	angiopoietin-like 3
12 AK002873				
12 NM_026434		67889		RIKEN cDNA 2010004P11 gene
12 NM_020564		57429	Sult-x1	sulfotransferase-related protein SULT-X1
12 AK012365				
12 NM_025788				
12 AK020699				
12 NM_011594		21858	Timp2	timp-2 tissue inhibitor of metalloproteinases type; metalloproteinase
12 NM_009327		21405	Tcf1	hepatocyte nuclear factor hnf-1
12 AK003860		66329		RIKEN cDNA 1700017111 gene
12 NM_013718				
12 NM_016877		53621	Cnol4	CCR4-NOT transcription complex, subunit 4
12 AK016213		67655		Similar to CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) phosphatase, subunit 1, isoform FCP [78% Human]
12 NM_010254		14428	Galr2	galanin receptor 2
12 NM_025387		66154		hypothetical protein HSPC194 [Homo sapiens] 85 %
12 U20780		unknown		Mus musculus ubiquitinating enzyme E2-230
12 NM_011401		20527	Slc2a3	glut3 encoding glucose transporter; exon 10
12 NM_019626		12404	Cbln1	cerebellin 1 precursor protein
12 NM_013519		14234	Foxc2	mesenchyme fork head-1 protein; mfh-1
12 NM_010422		15212	Hexb	129/sv beta-n-acetylhexosaminidase hexb; beta-hexosaminidase beta subunit
12 AK009282		71897		RIKEN cDNA 2310010M24 gene
12 NM_015826		50796	Dmrt1	doublesex and mab-3 related transcription factor dmrt1 candidate sexual regulatory protein; transcript
12 AK005213		66239		truncated SON protein [Mus musculus] 34 %
12 NM_025456				
12 NM_011221				
12 BC018470		23960	Oas1g	2-5 oligoadenylate synthetase 1G
12 NM_009038		19674	Rcvrn	recoverin
12 NM_018805		54710	Hs3st3b	d-glycosaminyl 3-O-sulfotransferase-3b 3-ost-3b
12 NM_008450		16593	Kns2	kinesin 2
12 AK010784		67383		RIKEN cDNA 2410127L17 gene
12 AK015384				

Figure 4-16

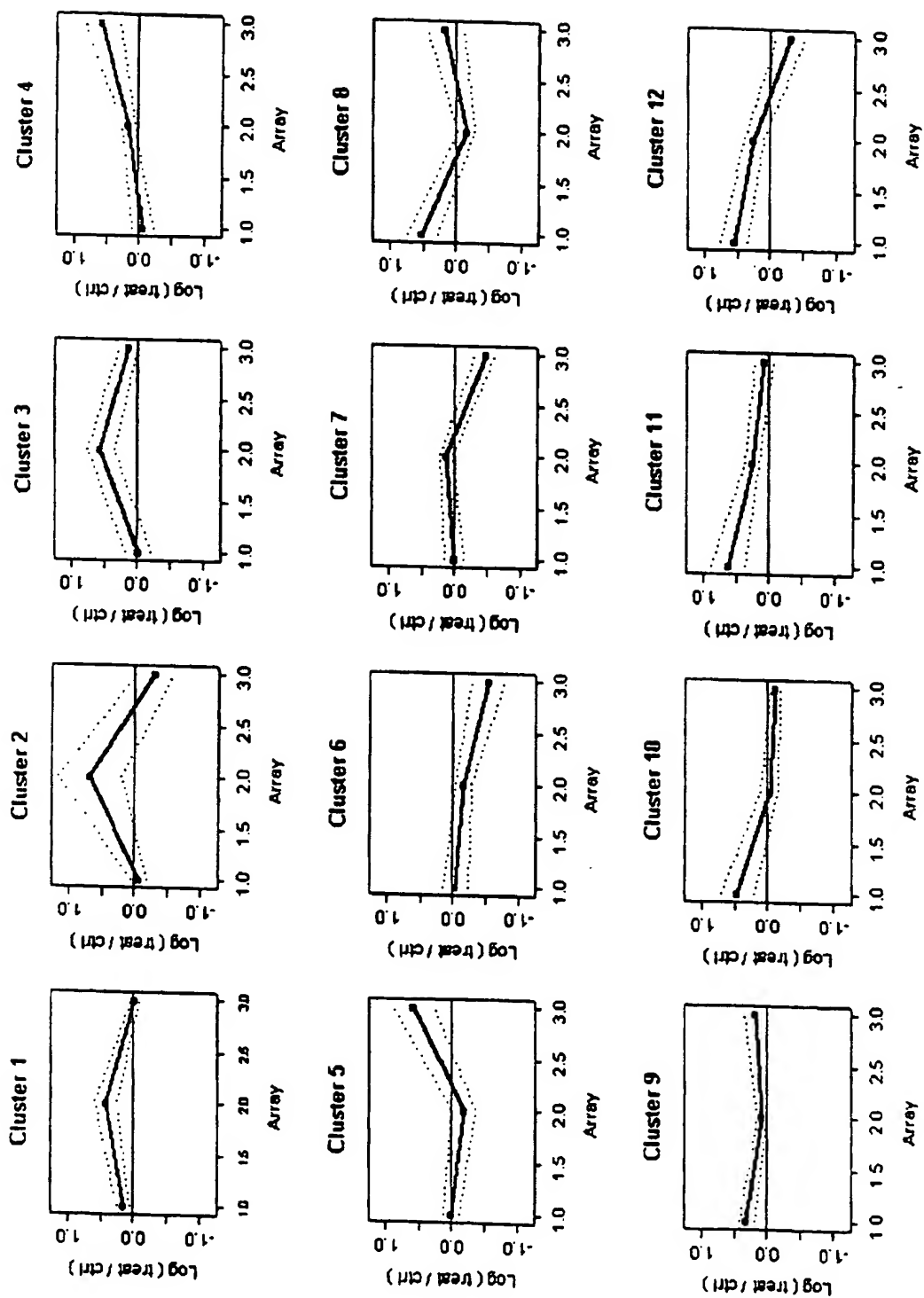


FIGURE 5-1

cluster analysis II
breast cancer
midbrain

Cluster Access	Locus	Gene	Description
1 NM_011498	20893	Bhlh62	basic helix-loop-helix domain containing, class B2
1 NM_023341	67426	Cabc1	chaperone, ABC1 activity of bc1 complex like
1 AB012265	22404	Wiz	widely-interspaced zinc finger motifs
1 AJ297743	30934	Tor1b	torsin family 1, member B
1 AK016520	71745	Cul2	culin 2
1 AK020272	77675		RIKEN cDNA 9130204G15 gene
1 AK020734	77785		RIKEN cDNA A330104J06 gene
1 AK017529	52447		DNA segment, Chr 8, ERATO Dci 633, expressed
1 NM_008705	18103	Nme2	expressed in non-metastatic cells 2, protein
1 NM_020032	56626	Poll	polymerase (DNA directed), lambda
1 NM_007408	11520	Adip	adipose differentiation related protein
1 AF052942	13143	Dapk2	death-associated kinase 2
1 NM_020505	57257	Vav3	vav 3 oncogene
1 AK004138	68732		hypothetical protein FLJ20048 [Homo sapiens] 76 %
1 AK016628	74427	Eaf1	Eaf1 protein
1 NM_023755	81879	Crr1	transcription repressor crr-1 developmentally regulated related to the cp2 family of factors
1 AK020739			
1 AK017226	75734		GL004 protein [Homo sapiens] 85 %
1 NM_016696	14733	Gpc1	glypican 1
1 AK015982	75220		Similar to Rag C protein [94% Homo sapiens]
1 AK014840	70821		RIKEN cDNA 4921507P07 gene
1 AK006679			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700041N15 product:CHEMOKINE-LIKE FACTOR 2 VARIANT 2
1 NM_015743	18124	Nr4r3	nuclear receptor subfamily 4, group A, member 3
1 AK020286	77697	Mimab	methylnalonic aciduria (cobalamin deficiency) type B homolog (human)
1 NM_080450	118446	Gja1	gap junction membrane channel protein epsilon 1
1 NM_019685	56505	Ruvb1	RuvB-like protein 1
2 NM_023537	69908	Rab3b	RAB3B, member RAS oncogene family
2 NM_015824	50793	Orc3	origin of replication 3 homolog s. cerevisiae orc3
2 NM_054040	68842	Tulp4	tubby super-family protein tusp
2 AK020331	77907		Mus musculus adult male epididymis cDNA, RIKEN full-length enriched library, clone:9230110K08 product:hypothetical HMG-I and HMG-Y DNA-binding domain (A+T-hoo
2 AK016466	70965		pleckstrin and Sec7 domain protein [56% Homo sapiens]
2 AK010429	71956		Z147_MOUSE Zinc finger protein 147 (Estrogen responsive finger protein) (Efp) 32 %
2 AK010455	71962		Similar to Gats protein [62% Mus musculus]
2 AK005748	69351		RIKEN cDNA 1700008A04 gene
2 D26157	19222	Ptgir	prostaglandin receptor
2 L42336			Mus musculus sodium channel 207 mRNA, 3 end
2 NM_019942	56526	38961	septin 6
3 NM_009311	21333	Tac1	tachykinin 1
3 NM_011375	20454	Slat9	siatyltransferase 9 (CMP-NeuAc:lactosylceramide alpha-2,3-sialyltransferase)
3 NM_031381	83555	Tex13	testis expressed gene 13
3 BC004783	252973	Ghr12	hypothetical protein FLJ13782 (94% human)
3 NM_025316	66046	Ndufb5	NADH dehydrogenase (ubiquinone) 1 beta subcomplex
3 AK013055	67059		hypothetical protein PTDO04; homologous yeast-44.2 protein [99% Homo sapiens]
3 AK012234	76795		vascular Rab-GAP/TBC-containing; BUB2-like protein 1 [Mus musculus] 48.54 %
3 AK009378			similar to glutathione peroxidase 2 [50% Homo sapiens]
3 NM_021339	57810	Cdon	oncogene-regulated cell adhesion molecule orcam
3 AK006201	57755	Dnajb7	DnaJ (Hsp40) homolog, subfamily B, member 7
3 NM_028218	72381		2119399A elongin B [Homo sapiens] 72 %
3 NM_008097	14488	Gcdh	glutaryl-coenzyme A dehydrogenase cdh
3 NM_027562	70809	Oclrp1	osteoclast inhibitory lectin related protein
3 BC004064	20682	Sox9	SRY-box containing gene 9
3 AK003912	77037		RIKEN cDNA 1110025G12 gene

FIGURE 5-2

Cluster Access	Locus	Gene	Description
3 NM_020291	58861	Ors25	odorant receptor S25
3 NM_007641	12482	Ms4a2	adult male thymus riken cdna clone:5830406p04
3 NM_008771	18436	P2rx1	purinergic receptor P2X, ligand-gated ion channel, 1
3 AK010252	74249	Lrrc2	leucine-rich repeat-containing 2
3 NM_013684	21374	Tbp	TATA box binding protein
3 Y19185	26875	Pcd	piccolo (presynaptic cytomatrix protein)
3 Y11896	12212	Chic1	cysteine-rich hydrophobic domain 1
3 NM_010072	13480	Dpm1	dolichol-phosphate (beta-D) mannosyltransferase 1
3 AK014905	70892		T12515 hypothetical protein DKFZp434B103.1 - (28% human)
3 AK002723	75393		BAK_MOUSE Bcl-2 homologous antagonist/killer (Apoptosis regulator BAK)
3 NM_019551	56196	Trap	Traf and Tnf receptor associated protein; DNA segment, Chr 13, ERATO Dcl 656, expressed [Mus muscul 100 %
3 NM_021323	57775	Usp29	ubiquitin specific protease 29
3 NM_008661	17919	Myo5b	myosin vb
3 NM_020566	57431	Dnaic4	multiple endocrine neoplasia type candidate protein number 18 dnaj family protein mcg18; adult male small intestine riken cdna clone:2010301j22
4 NM_033564	93734	Mpv17l	Mpv17 transgene, kidney disease mutant-like
4 AK014006	77035		RIKEN cDNA 3110005OZ1 gene
4 AK018541	71564		9030607L17RIK RIKEN cDNA 9030607L17 gene
4 AK002363	70337		Mouse adult male kidney cDNA, RIKEN full-length enriched library, clone:0610009A07 product:hypothetical Nitroreductase family containing protein
4 AK012666	69933		RIKEN cDNA 2810004A10 gene
4 NM_025844	66917	Chordc1	cysteine and histidine-rich domain (CHORD)-containing, zinc-binding protein 1
4 NM_008642	17777	Mltip	microsomal triglyceride transfer protein
4 AK013166	67607		Similar to 148668 zinc finger protein 51 - mouse 43%
4 NM_009237	20675	Sox3	SRY-box containing gene 3
4 NM_023409	67963	npc2	Niemann Pick type C2
4 AK020456	77289		RIKEN cDNA 9430034F23 gene
4 AK004824	67528	Nudt17	nudix (nucleoside diphosphate linked moiety X)-type motif 7
4 AF317202	170742	RBD1	replication protein-binding trans-activator
4 AF061744	23880	Fyb	lyn binding protein lya-130
4 NM_008343	16009	Igf1bp3	insulin-like growth factor binding protein-3
4 AK012215	212772		RIKEN cDNA 2700007P21 gene
4 AK013804	70839	P2ry12	purinergic receptor P2Y, G-protein coupled 12
4 AK020307	77701		NCAL_HUMAN Neurofilament-associated lipocalin precursor (NCAL) (25 kDa alpha-2-microglobulin-related subunit of MUP-9) (Oncogene 24p3) (32% human)
5 NM_013615	18286	Odf2	outer dense fiber of sperm tails 2
5 NM_020570	57434	Xrcc2	X-ray repair complementing defective repair in Chinese hamster cells 2
5 NM_025509	66357		cDNA 2310008M10 [Mus musculus]
5 NM_025388	66155		RIKEN cDNA 1110021H02 gene
5 NM_007549	12143	Blik	B lymphoid kinase
5 NM_009513	22360	Vmp	vesicular membran protein p24
5 AK014820	74351		DD17_HUMAN Probable RNA-dependent helicase p72 (DEAD-box protein p72) (DEAD-box protein 17) 48 % /
5 NM_030811	83702	Akr1c8	Akr1c8
5 NM_010197	14164	Fgf1	fibroblast growth factor 1
5 BC016456	69459		RIKEN cDNA 2300004C15 gene
5 BC008101	68939		hypothetical protein MGC2827 [94% Homo sapiens]
5 NM_009198	20504	Sic17a1	solute carrier family 17 (sodium phosphate), member 1
5 AJ011106	12723	Clen1	chloride channel 1
5 NM_026158	67441		RIKEN cDNA 0610042E07
6 NM_009537	22632	Yy1	YY1 transcription factor
6 NM_026768	68565	Mips18a	mitochondrial ribosomal protein S18A
6 NM_009125	20239	Sca2	spinocerebellar ataxia 2 homolog (human)
6 AK008003	72045		RIKEN cDNA 2010001E11 gene
6 AF218265	140474	Muc4	mucin 4
6 NM_009806	12361	Cask	calcium/calmodulin-dependent serine protein kinase

FIGURE 5-3

Cluste Access	Locus	Gene	Description
6 NM_011788	23832	Xcr1	chemokine (C motif) receptor 1
6 AF233580	107392	Brrs1	breast cancer metastasis-suppressor 1
6 NM_030735	81010	V3R9	pheromone receptor V3R9
6 NM_009352	21749	Terf1	telomeric repeat binding factor 1
6 NM_019817	56447	Copz1	copz1 nonclathrin coat protein zeta-cop
6 NM_011660	22166	Txn1	thioredoxin 1
6 X70920	17072	Ly6g	lymphocyte antigen 6 complex, locus G
6 BC005775	66440		RIKEN cDNA 2010012C09 gene
7 AK013984	73112		Mouse 13 days embryo head cDNA, RIKEN full-length enriched library, clone:311003A17 product:unknown EST
7 NM_011991	26572	Cops3	COP3 (constitutive photomorphogenic) homolog, subunit 3 (Arabidopsis thaliana)
7 NM_025751	66763		RIKEN cDNA 4933425L06 gene
7 NM_013789	27414	Gnefr	guanine nucleotide exchange factor (RCC1 related)
7 NM_019803	22213	Ube2g2	ubiquitin-conjugating enzyme E2G 2
7 NM_011883	24017	Rnf13	ring finger protein 13
7 X69942	13990	Eli1	enhancer trap locus 1
7 NM_010053	13390	Dlx1	distal-less homeobox
7 NM_008884	18854	Pml	promyelocytic leukemia
7 NM_010740	17064	C1qr1	complement component 1, q subcomponent, receptor 1
7 AB033615	224860	Ptd2	phospholipase C-like 2
7 AK010827	76454		T17239 hypothetical protein DKFp434B027.1 - human (fragment) 85 %
7 AK007494	76826		similar to hypothetical protein FLJ12660 [90% Homo sapiens]
7 AK004502	69064		RIKEN cDNA 1810014F10 gene
7 AK021408	68927		hypothetical protein FLJ12598 (72% human)
7 NM_025714	78733		-138487 lasin - human 51.90 %
7 L20343	52184		DNA segment, Chr 3, ERATO D01 250, expressed
7 AK006118	12296	Cacnb2	calcium channel, voltage-dependent, beta 2 subunit
7 NM_008937	19130	Prox1	RIKEN cDNA 1700019F09 gene
7 AF296075	81896	Wdr10	prospero-related homeobox 1
7 Z35167	12829	Col4a4	WD repeat domain 10
7 NM_011251	19654	Rbm6	balb/c collagen iv alpha 4 chain; col4a4
7 NM_011786	23801	Alox63	RNA binding motif protein 6
7 U92456	20817	Srpk2	arachidonate lipooxygenase 3
7 AK007386	69094		serine/arginine-rich protein specific kinase 2
7 NM_011740	22631	Ywhaz	RIKEN cDNA 1810008O21 gene
7 AF230395	22670	Trim26	tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein, zeta polypeptide
7 NM_008556	18611	Pea15	tripartite motif protein trim26 alpha
7 AJ133536	20955	Sybl1	phosphoprotein enriched in astrocytes 15
7 AK012092	72193		synaptobrevin like 1
7 NM_008407	16426	Iih3	Similar to splicing factor, arginine/serine-rich 2, interacting protein; SC35-interacting protein 1 [86% Human]
7 AK009937	71941		inter-alpha trypsin inhibitor, heavy chain 3
7 AK017879	77011		hypothetical protein FLJ12118 [77% Homo sapiens]
7 AK005386	72008		Mouse 8 days embryo whole body cDNA, RIKEN full-length enriched library, clone:573059G19:hypothetical protein
7 AK016959	71306		hypothetical protein FLJ14840 [Homo sapiens] 79 %
8 AK011897	72495		A56745 microfibril-associated protein 3 - human 58 %
8 NM_026630	68236		RIKEN cDNA 2610208C17 gene
8 NM_053011	94217	Lrp1b	Mus musculus RIKEN cDNA 2410116G06 gene (2410116G08Rik)
8 NM_026309	67678		low density lipoprotein-related protein 1B (deleted in tumors)
8 NM_007442	11695	Alk4	LSM3_HUMAN U6 snRNA-associated SM-like protein LSM3 (MDS017) 100 %
8 AK016497	70980		aristless 4
8 AK005096	70364	Pxp	RIKEN cDNA 4931431F19 gene
8 BC004727	67776		peroxisomal protein
			RIKEN cDNA 5830475I08 gene

FIGURE 5-4

cluster analysis II
breast cancer
midbrain

Cluster Access	Locus	Gene	Description
8 NM_053168	94091	Trim11	tripartite motif protein trim11
8 NM_021332	14652	Gip1r	glucagon-like peptide 1 receptor
8 AK015842	75106		RIKEN cDNA 4930519F16 gene
8 AK012063	67181	Dullard	Dullard homolog (Xenopus laevis)
8 AK007657	69151		
8 NM_008667	17936	Nab1	Ngfr-A binding protein 1
8 AK017530	70502		RIKEN cDNA 5730409E15 gene
8 NM_018758	57267	Apba3	amyloid beta (A4) precursor protein-binding, family A, member 3
8 AF285585	30054	Rnf17	ring finger protein 17
8 NM_009744	12053	Bcl6	B-cell leukemia/lymphoma 6
8 AK021056	77314		sp:P46096 - SYT1_MOUSE Synaptotagmin 1 (Sytl) (p65) 38 %
8 NM_013592	17183	Main4	matrilin 4
8 NM_013908	30839	Fbxw5	F-box and WD-40 domain protein 5
8 AF343752	77053	Unc84a	unc-84 homolog A (C. elegans)
8 NM_007657	12527	Cd9	CD9 antigen
8 AK015371	74686		RIKEN cDNA 4930443G12 gene
8 AK013202	20467	Sin3b	transcriptional regulator, SIN3B (yeast)
8 AK014490	73130		CA00_HUMAN Protein CGI-100 precursor (89% human)
8 AK009086	69533		similar to keratin associated protein 4.7 [31% Homo sapiens]
8 NM_013728	27216	Olfrl154	olfactory receptor 154
8 NM_008554	17173	Ascl2	achaete-scute complex homolog-like 2 (Drosophila)
8 NM_008763	12182	Bst1	bone marrow stromal cell antigen 1
8 M12289	17885	Myh8	perinatal skeletal myosin heavy chain 3 end
8 NM_008517	16993	Liadh	leukotriene A4 hydrolase
9 NM_008301	15512	Hspa2	heat shock protein 2
9 NM_019991	56635	Prlpm	prolactin-like protein M
9 NM_026613	68201		hypothetical protein MGC14827 (85% human)
9 AK010476	71979		RIKEN cDNA 2410012M07 gene
9 AK006472	74239		Rab6-interacting protein 2 [Mus musculus] 23.36 %
9 NM_013476	11835	Ar	androgen receptor
9 NM_018769	17127	Madh3	mad homolog 3 drosophila madh3; msnad3
9 NM_026031	67205	Cg94	CGI-94 protein
9 NM_009843	12477	Ctla4	cytotoxic T-lymphocyte-associated protein 4
9 NM_011992	26511	Rcn2	reticulocalbin 2
9 AK010876	66828		Similar to hypothetical protein FLJ20546 [82% Homo sapiens]
9 AK002774	72114		hypothetical protein MGC15435 [Homo sapiens] 51 %
9 NM_023217	66522		PGPI_HUMAN Probable pyridoxine-carboxylate peptidase (5-oxoprol-5-peptidase) (Pyroglutaryl-peptidase 95 %
9 NM_010671	16699	Krtap13	keratin associated protein 13
9 AK007667	69171		
9 AK015848	74721		zinc finger protein 341 [Homo sapiens] 90%
9 NM_013700	22225	Usp5	ubiquitin specific protease 5 (isopeptidase T)
9 NM_030701	80885	Puma-g	putative seven transmembrane spanning receptor puma-g
9 AF056187	16001	Igf1r	insulin-like growth factor I receptor Igf1
9 NM_009757	12155	Bmp15	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 bmp15
9 NM_080638	76388	Mvp	major vault protein
9 NM_015733	12371	Casp9	caspase 9
9 AK016890	71099		serine/threonine kinase FKSG81 [Homo sapiens] 44 %
9 NM_027170	69696		JC8547 high sulfur protein B2E - rat 37 %
9 NM_007574	12262	C1qg	complement component 1, q subcomponent, gamma polypeptide
9 AK004076	68036		HSPC038 protein [Homo sapiens] 100 %
8 AK012664	69922	Vrk2	vacuolin related kinase 2
9 NM_022024	63986	Gm1g	glia maturation factor, gamma

FIGURE 5-5

cluster analysis II
breast cancer
midbrain

Cluster Access	Locus	Gene	Description
9 NM_007407	11517	Adcyap1r1	adenylylate cyclase activating polypeptide 1 receptor 1
9 AF44804	72162	Odx36	
9 NM_023175	52633		Nil protein 2 [89% Homo sapiens]
9 NM_016849	54131	IRF3	interferon regulatory factor-3 irf3; factor 3
9 NM_011054	18575	Pde1c	phosphodiesterase 1C
9 NM_019435	104130	Np15	Nuclear neuronal protein 15.6
9 NM_008348	16154	IL10RA	interleukin-10 receptor alpha
9 AK009749	69654		DYNC_Human Dynactin complex 50 kDa dynein-associated polypeptide (Dynamitin) (DCTN-84 %
9 AK012571	66109		Tetraspan NET-6 (95% human)
9 AK005105	66980		Similar to WD domain, G-beta repeat-containing protein [Homo sapiens] 83 %
9 AK004550	71707	Tere1	transitional epithelia response protein
9 X72307	15234	Hgf	hepatocyte growth factor
9 NM_013483	12231	Blin1a1	bulkyophilin, subfamily 1, member A1
10 NM_007986	14089	Fap	fibroblast activation protein
10 NM_023788	75625		RIKEN cDNA 2010107K23 gene
10 NM_008550	17160	Man2b2	mannosidase 2, alpha B2
10 NM_009814	12373	Casq2	calsequestrin 2
10 AK004934	71774		Similar to APXL_HUMAN Apical-like protein (APXL protein) humna 28 %
10 NM_032002	83961	Nrg4	neuregulin 4 nrg4
10 NM_024465	76192		RIKEN cDNA 6330583M11 gene
10 AK010471	68876		RIKEN cDNA 1110068E08 gene
10 AK005678	321010		RIKEN cDNA 1700006J14 gene
10 AK004654	71709		similar to A49307 98K GTPase-activating protein ABR, brain - human 29 %
10 NM_021454	58804	Cdc42ep5	CDC42 effector protein (Rho GTPase binding) 5
10 X59150	21594	Tcrb-V20	T-cell receptor beta, variable V20
10 NM_026318	67693		Huntingtin interacting protein K; hypothetical protein [Homo sapiens] 99
10 NM_008720	18145	Npc1	niemann pick type c1
10 NM_030749	81500	Sil1	Sil1
10 L32973	22169	Tyki	thymidylate kinase family LPS-inducible member
10 NM_029091	74764		likely ortholog of kinesin light chain 2 [69% Homo sapiens]
10 AK008409	67019	Actr6	ARP6 actin-related protein 6 homolog (yeast)
10 NM_053271	116838	Rims2	regulating synaptic membrane exocytosis 2
10 AK004164	68777		hypothetical protein FLJ22353 [Homo sapiens] 85 %
10 NM_009888	12614	Celsr1	cadherin egr1g seven-pass g-type receptor celsr1
10 NM_022029	64011	nrgn	neurogranin
11 AK008736	70153		Similar to hypothetical protein MGC10989 [Homo sapiens] 81.25 %
11 NM_026487	67979		- A55190 transitional endoplasmic reticulum ATPase (EC 3.6.1.-) [validated] - rat 35 %
11 AB035322	108897		hypothetical protein FLJ12783 [Homo sapiens] 96 %
11 NM_009418	22019	Tpp2	tripeptidyl peptidase II
11 NM_020005	18519	Pcaf	p300/CBP-associated factor
11 AK021281	78571		RIKEN cDNA C630050I24 gene
11 NM_011856	23964	Odz2	odd Oz/ten-m homolog 2 (Drosophila)
11 NM_008108	72043	Sulf2	sulfatase 2
11 NM_030713	80902	Zfp202	zinc finger 202 m1 znf202 scan-krab-zinc protein znf202-m1
11 NM_009827	12425	Cckar	cholecystokinin A receptor
11 AK017569	74737		RIKEN cDNA 5730417B17 gene
11 AK021160	77478		Mouse adult male corpus striatum cDNA, RIKEN full-length enriched library, clone:CD30048.101 :hypothetical protein
11 AK020460	77252		S12207 hypothetical protein (B2 element) - (80% mouse)
11 AK013765	72962	Ecgf1	endothelial cell growth factor 1 (platelet-derived)
11 NM_010358	14862	Gstm1	expressed in non-metastatic cells 2, protein
11 NM_013819	18388	Olf67	olfactory receptor 67
11 AK018525	72133		hypothetical protein CLONE24922: hypothetical protein [30% Homo sapiens]

FIGURE 5-6

Cluster Access	Locus	Gene	Description
11 AK009387	69578		RIKEN cDNA 2310016G11 gene
11 AK016715	76799		Similar to 158401 protein-tyrosine kinase (EC 2.7.1.112) JAK3 - mouse 69%
11 NM_020598	18314	Olfir17	olfactory receptor 17
11 NM_028740			similar to contrapsin-like protease inhibitor related protein (CPI-23) [Rattus norvegicus]
11 AK009097	71886		RIKEN cDNA 2310003M01 gene
11 NM_018809	19652	Rbm3	RNA binding motif protein 3
11 AK015098	73818		RIKEN cDNA 4930405H06 gene
11 AB030190	108650		tripartite motif protein 11 [Mus musculus] 33.50 %
11 AK019795	76322		YA02_HUMAN HYPOTHETICAL PROTEIN DJ1198H6.2 [50% HUMAN]
11 AK014702	74589		Similar to KHL1_MOUSE Kelch-like protein 1 30%
11 AK014230			Mouse 13 day embryo head cDNA, RIKEN full-length enriched library, clone:3110057P17 :hypothetical protein
11 AK019522	78783	Brpf1	bromodomain and PHD finger containing, 1, p12JC2069 - JC2069 zinc-finger protein, BR140 - human 97.77 %
11 AK007540	69769		hypothetical protein FLJ23467 [Homo sapiens] 93 %
11 NM_007770	12951	Crx	homeodomain protein crx homeobox
11 AK015757	74720		Similar to Voltage-dependent Ca ²⁺ channel gamma-4 subunit (Neuron, voltage-gated Ca channel) [28% Human]
11 NM_078484	22232	Slc35a2	solute carrier family 35 member slc35a2 udp galactose translocator; mugli1 udp-galactose transporter
11 NM_019924	56613	Rps6ka4	ribosomal protein S6 kinase
11 AK016707	74420		RIKEN cDNA 4933406P04 gene
11 NM_026132	67402		THIO_HUMAN Thioredoxin (ATL-derived factor) (ADF) (Surface associated sulphydryl protein) (SASP) 52 %
11 NM_023266	104348	Zfp120	zinc finger protein 120
11 NM_011658	22160	Twist1	twist gene homolog 1 (Drosophila)
11 NM_010909	18038	Nkhlb1	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
11 NM_008947	19179	Psmc1	protease (prosome, macropain) 26S subunit, ATPase 1
11 AF067063			2-cell-stage, variable group, member 1; variable group of 2-cell-stage gene family
11 NM_011826	23897	Hstbp1	HST binding protein
11 NM_023631	76588		RIKEN cDNA 1500035H01 gene
11 NM_053192	94228	Ucc1	upregulated in colorectal cancer gene 1
12 NM_020606	57342	Parva	parvin, alpha
12 AK017362	75736		BCL2-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
12 NM_009255	20720	Serpine2	serine (or cysteine) proteinase inhibitor, clade E, member 2
12 BC003836	52551	Sgt	small glutamine-rich tetrapeptide repeat
12 NM_009760	12176	Bnlp3	BCL2/adenovirus E1B 19kDa-interacting protein 1, NIP3
12 NM_007507	11958	Atp5k	atp synthase h+ transporting mitochondrial f1f0 complex subunit e atp5k; ifm-1 f1fo-atpase
12 BC006048	14194	Fh1	fumurate hydratase 1
12 NM_019745	56426	Pdcd10	programmed cell death 10
12 NM_019645	18772	Pkpx1	plakophilin 1
12 AF215896	11790	Apeg1	siriated muscle-specific serine/threonine protein kinase speg
12 AK007013	74282		A55575 ankyrin 3, long splice form - (28.61% human)
12 AK016847	73845		

Figure 5-7

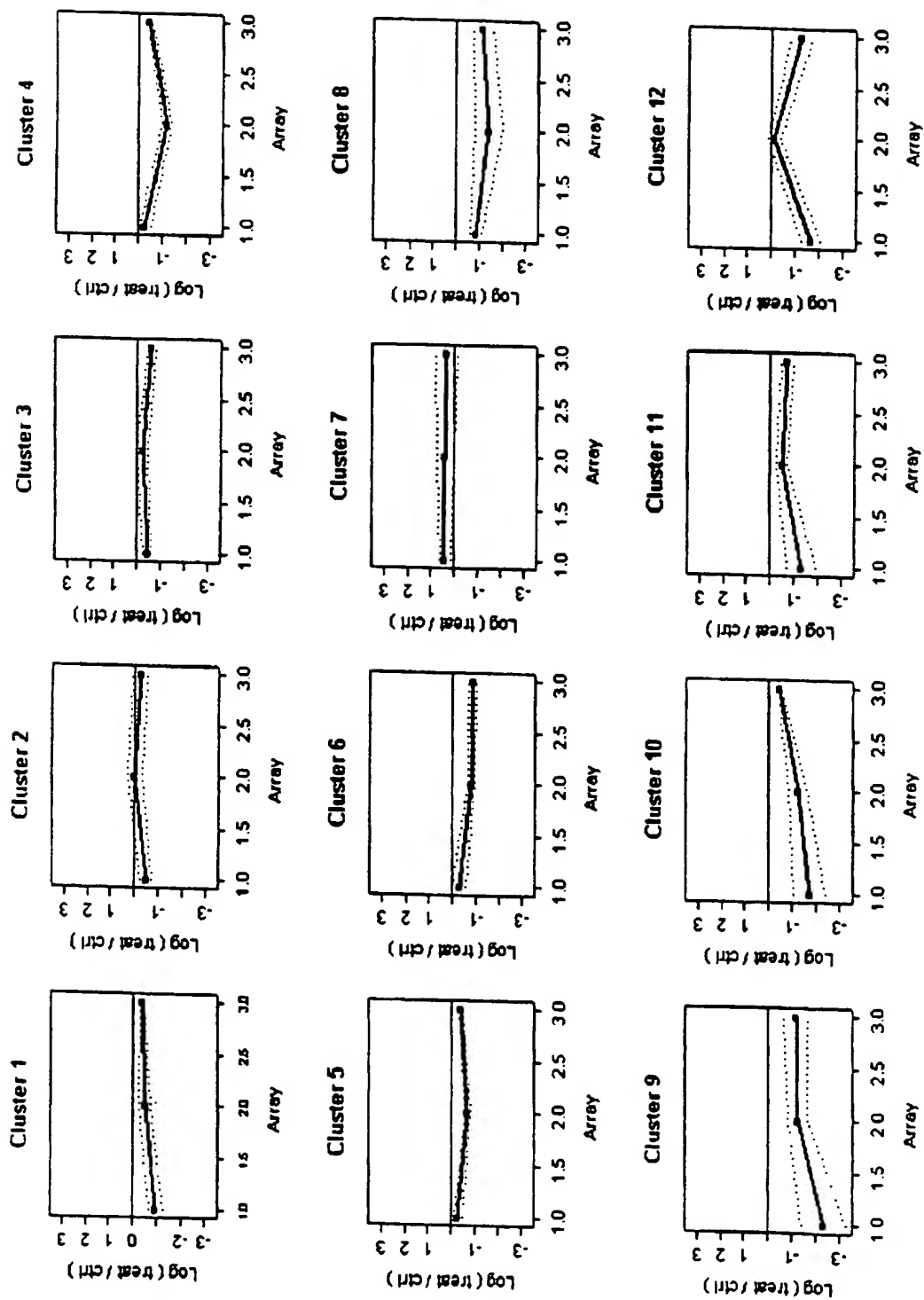


FIGURE 6-1

Cluster Access	Locus	Gene	Description
1 AK015845	17930	Myom2	myomesin 2 myom2
1 NM_008664	13406	Drp1	dynlcn malin protein 1
1 AJ242625	14065	F2r3	protease-activated receptor 4 par4 g protein-coupled receptor (thrombin
1 NM_007975	13801	Enam	enamelin - ENAM MOUSE Enamelin precursor 100 %
1 NM_017468	27393	Mmp39	10 day old male pancreas riken cDNA clone:1810033d11; unknown c21or8
1 X76011			
1 AK004006			
1 NM_018774	19250	Ptpn14	putative protein tyrosine phosphatase ptp38 a sh3-binding site in the spacer region connecting n-terminal band 4,1-like domain and c-terminal p
1 NM_008976			
1 AK014894			
1 NM_016778	73616		RIKEN cDNA 1700125F08 gene
1 AK007277	16197	Itir	interleukin receptor alpha-chain ltr7a; ltr
1 NM_008372	13099	Cyp2c40	Cytochrome P450, family 2, subfamily c, polypeptide 40
1 NM_010004	76775		RIKEN cDNA 2410193C02 gene
1 AK010634			
1 NM_019657	12723	C1cn1	chloride channel 1
1 AJ071106	26573	Irbf1	interferon response element binding factor 1
1 NM_013714			
1 AK016979	65962	Slc8a3r2	solute carrier family 8 isoform 3 regulator 2, isoform A; sodium/hydrogen exchanger [Mus musculus] 100 % /
1 NM_023055	66239		truncated SON protein [Mus musculus] 34 %
1 AK005213	69473		keratin associated protein 3.1 [87% Homo sapiens]
1 AK009119	84112	Gpr91	G protein-coupled receptor 91
1 NM_032400	97998	R75183	Mus musculus partial mRNA for w104 protein
1 AJ250690	BC004774		expressed sequence R75183
1 BC004774	12672	Chrm4	cholinergic receptor muscarinic 4 chrm4
1 NM_007699			
1 X74266	56838	Scya28	small inducible cytokine a28 scya28
1 NM_020279	21749	Tert1	telomeric repeat binding factor 1
1 AK010113			
1 NM_009352	15464	Hrc	histidine rich calcium binding protein
1 AK007894	71166		RIKEN cDNA 4933424G06 gene
1 NM_010473	54486	Pdgfr2	prostaglandin D2 synthase 2, hemolipoletic
1 AK016893	18918	Lmyc1	l-myc
1 NM_019455	18283	Odc	ornithine decarboxylase, structural
1 NM_008506	16192	Ilsra	interleukin-5 receptor receptor precursor
1 NM_013814	68133		18 days embryo riken cDNA clone:111001816; 5730591c16 5730591c16 (Bnk
1 NM_008370	77836		AS5253 melanoma antigen MART-1 [87% human]
1 NM_026572	244672		RIKEN cDNA 3230401L03 gene
1 AK020928	259434	MOR224-6	olfactory receptor MOR224-6
1 AK014327	13875	Erf	esr2 repressor factor erf
1 AF282302	15139	Hc	complement component c5s pro-c5 precursor
1 NM_010155			
1 NM_010406	70963		RIKEN cDNA 4931402H11 gene
1 AK006388	107045		hypothetical protein FLJ10595 (88% human)
1 AK016424			
1 BC006060	72075	Ogfr	opoid growth factor receptor
1 AK020377			
1 NM_031373	79263	Trim39	tripartite motif protein 39
1 NM_024468	57439		RIKEN cDNA 1300007B12 gene
1 NM_020588	67662		RIKEN cDNA 2310033P09 [Mus musculus] 100 %
1 NM_024210	72064		RIKEN cDNA 2010012G17 gene
1 AK008209			
1 AK010336	22269	Upk2	uroplakin II upk2
1 NM_009476	74691		adult male testis riken cDNA clone:4930441e05
1 AK015351	56299	Fkbp1	FK506 binding protein-like
1 NM_019873			
1 AK003511			
1 AK002744			

FIGURE 6-2

cluster analysis I
lung cancer
Midbrain

Cluster Access	Locus	Gene	Description
1 NM_033572	73703	Dppa2	developmental pluripotency associated 2
1 AK010743	63796	Smarca2	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 2
1 AF_069905	56996		hypothetical protein, MNCs-1301 [100% Mus musculus]
1 AK016967	22376	Wnt5	Wiskott-Aldrich syndrome homolog (human)
1 NM_009515	22337	Vdr	vitamin d receptor
1 NM_009504			
1 AF303106			
1 AK007700	66349		RIKEN cDNA 2310004L02 gene
1 NM_025504	74533	Zfp336	zinc finger protein 336
1 AK018470	17937	Nab2	Nhl-A binding protein 2
1 NM_008668	30949	Lcm1	leucine carboxyl methyltransferase lcm1
1 NM_025304			
2 AK010084	64378	Gpr88	G-protein coupled receptor 88
2 NM_022427	19330	Rab18	ras-related protein rab18
2 NM_011225	68544		RIKEN cDNA 1110002H14 gene
2 AK009653			
2 NM_020493	69736		RIKEN cDNA 2810039M17 gene
2 AK010370			
2 AK005168	17850	Mutl	methylmalonyl-coenzyme a mutase mut
2 NM_008650	26878	B3gal12	udp-galactose 4-epimerase 13-galactosyltransferase polypeptide b3gal12
2 NM_020025			
2 AK016255	75858		RIKEN cDNA 4500568L21 gene
2 AK010010			
2 NM_015630			
2 BC006036			
2 NM_007670	12579	Cdkn2b	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)
2 BC016329	70380		hypothetical protein dJ47384 [96% Homo sapiens]
2 NM_013556			
2 AF314149	107589	Mytk	myosin, light polypeptide kinase
2 BC002251			
2 NM_009732	11998	Avp	arginine vasopressin
2 NM_010569			
2 NM_023135	20248	Serpina4	serine (or cysteine) proteinase inhibitor, clade B, member 4
2 NM_009128	22592	Erc5	erc5 dna repair nuclear localization signals at aa914-918 and aa1154-1158, ultraviolet sensitive phenotype; endonuclease xpg
2 NM_011729	12299	Cacng1	calcium channel voltage-dependent gamma subunit cacng1
2 NM_007582	12561	Cdh4	cadherin 4
2 NM_009867	20391	Sgca	sarcoglycan, alpha (lysine-rich-associated glycoprotein)
2 NM_009161	12840	Col5a2	alpha2(I) collagen
2 NM_007741	17274	Me1	cell line NK14 derived transforming oncogene
2 NM_023126			
2 NM_011161	27081	Zfp275	Zinc finger protein 275
2 AK017375	50762	Fbxo6b	F-box only protein 6b
2 NM_015797	53604	Zfp6	zona pellucida binding protein
2 NM_015785	54651	Usp27x	ubiquitin specific protease 27, X chromosome
2 AF229643			
2 NM_026219	67735		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930528A17 product:unknown EST
2 AK015922	73051		RIKEN cDNA 2900058P18 gene
2 AK013710	70719		PTPL1-associated RhoGAP 1 [Homo sapiens] 34.79 %
2 AK018130	18415	Ilgp2l	integrin beta 2-like ilgp2l
2 NM_008405	20055	Rps16	816 ribosomal protein
2 NM_013647	68513	Map3k7ip1	mitogen-activated protein kinase kinase kinase 7 interacting protein 1
2 AK009321	226049	Dmrt2	doublesix and meab-3 related transcription factor 2
2 AF080623	75770		RIKEN cDNA 4833424K13 gene
2 AK014760			
2 X81632	15978	Iifar2	interferon alpha and beta receptor 2 Iifar2; type 1 Iifar2c
2 NM_010509			
2 NM_011409	11409	Acads	acetyl-coenzyme a dehydrogenase short chain acids
2 NM_007383	11639	Ak4	ak4 adenylate kinase 4
2 NM_009647			

FIGURE 6-3

Cluster Access	Locus	Gene	Description
2 BC002199	211556		hypothetical protein MGC7434
2 NM_008589	17293	Mesp2	mesoderm posterior 2 mesp2
2 NM_025339			
2 NM_011909			
2 AB037869			
2 AK005944			
2 AK017809	12308	Calb2	calbindin 2
2 AK003850			
2 NM_019518	56072	Lgals12	lectin, galactose binding, soluble 12
2 NM_026369	67811	Pdp38	polymerase delta interacting protein 38
2 NM_007503	11936	Fryd2	gamma subunit of sodium potassium ATPase
2 NM_011336	20301	Scya27	adult female placenta riken cDNA clone:1600023b02; small inducible cytokine a27 scya27
2 AK015753	75820		RIKEN cDNA 4930511H01 gene
2 NM_025489	66326		
2 AK009368	69545		Similar to HUMAN Stress-induced-phosphoprotein 1 (STP1) (Hsp70/Hsp90-organizing protein) [44% Human] slp1
2 NM_021344			
2 AK019915	57816	Tesc	testudin tesc
2 NM_021274			
2 AK003517	15945	Cxcl10	chemokine (C-X-C motif) ligand 10
2 NM_009104	65198		terminal modulator protein [Homo sapiens] 39 %
2 NM_015757	20135	Rrm2	ribonucleotide reductase M2
2 AK006504	30826	Pcdh13	protocadherin 13
2 AK019737	76380		Rab6-interacting protein 2 [Mus musculus] 24 %
2 AK016083	78807		RIKEN cDNA 4830541D04 gene
2 AK005982	75311		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930550C14 product:hypothetical IQ calmodulin-binding motif containing protein
3 NM_028162	69389		H2B histone family, member C [Homo sapiens] 44 %
3 AK019325	67448		adult male lung riken cDNA clone:1200007124
3 NM_019572			Mus musculus adult male hippocampus cDNA, RIKEN full-length enriched library, clone:29000034J12
3 NM_031402	56233	Hdacr7a	histone deacetylase Hdac7
3 AK014882			
3 NM_011203	20022	Rpo2-4	rna polymerase II 4.14 kDa subunit rpo2-4
3 AK014142	61287		T34522 hypothetical protein DKF3p566D244.1 (95% human)
3 L49344			
3 NM_019811	60525	Acs2	acetyl-Coenzyme A synthetase 2 (ADP forming)
3 NM_013684	20405	Sh3gl1	SH3-domain GRB2-like 1
3 AK016299	75804		KIAA0547 gene product [80% Homo sapiens]
3 AK008713	70388		leucine-rich and death domain containing; p53 protein induced, with death domain [Mus musculus] 40.00 %
3 NM_011855	23953	Odz1	odd Oz/len-m homolog 1 (Drosophila)
3 NM_010887	17993	Ndu54	radh dehydrogenase ubiquinone fe-s protein 4 18 kDa ndu54; 13 days embryo liver riken cDNA clone:2510049a12
3 AK007415	73634		CHD1_MOUSE CHROMODOMAIN-HELICASE-DNA-BINDING PROTEIN 1 (CHD-1)40 %
3 AK015229			
3 NM_025368	12576	Cdkn1b	cyclin-dependent kinase inhibitor 1B (P27)
3 NM_009875	18046	Nlyc	nuclear transcription factor-y gamma nlyc; factor yc
3 NM_008692	93671	Cd163	CD163 antigen
3 NM_053094	59053	Bp18	brain protein 16; DNA segment, Chr 15, ERATO Dcl 741, expressed [Mus musculus] 100 %
3 NM_021555			
3 NM_033134	72014		A53202 cytoophlin C-associated protein MAMACYPAP precursor - mouse 26.12 %
3 AK005160	71519	Cyp2u1	cytochrome P450, family 2, subfamily u, polypeptide
3 AK018459	14211	Snc21	SMC2 structural maintenance of chromosomes 2-like 1 homolog (yeast)
3 BC011064			
3 AK003820			mammalian alonal homologue 4a homolog helix-loop-helix protein; neurogenin ngr2
3 NM_008718	11924	Algh4	
3 NM_011961			
3 NM_024477	79562		hypothetical protein, MGC:7623; hypothetical protein MGC7623 [100% Mus musculus]
3 AK011496			
3 NM_025568			
3 BC002120			
3 AK007707			
3 NM_011292	20005	Rpl9	mutant ribosomal protein l9 mus8nu this is strongly immunogenic and recognized by cd44 cells; 11 days embryo riken cDNA clone:2700056g17

FIGURE 6-4

Cluster Access	Locus	Gene	Description
3 NM_013923	30945	Rnf19	ring finger protein (C3HC4 type) 19
3 AK003581	22180	Ubc	ubiquitin C
3 NM_019639	14429	Gai3	galanin receptor 3
3 NM_015738	54194	Nkap95	neighbor of B-kinase anchoring protein 95 nkap95; 10 days embryo riken cdna clone:261005522
3 NM_017476			
3 AK016522	17451	Mos	Midway sarcoma oncogene
3 NM_020021	19119	Pim2	adult male testis riken cdna clone:1700007k08
3 NM_008933			
3 AJ223472	15930	Indo	Indoleamine-pyrole 2,3 dioxygenase
3 NM_008324			
3 AK003651	14000	Elohd2	ethanol induced 2 [putative ribonuclease III; putative protein p241 which interacts with transcription factor Sp1 Hom 99 %]
3 NM_010027			
3 NM_025790			
3 AK016431			
3 AK002245	17477	Mog	N-methylpurine-DNA glycosylase
3 NM_010822			
3 BC016080	22631	Ywhaz	tyrosine 3-monoxygenase/hydrophobic 5-monoxygenase activation protein, zeta polypeptide
3 NM_011740			
3 AK007580	19771	Rbp1	lysine 3-monoxygenase/hydrophobic 5-monoxygenase activation protein, zeta polypeptide
3 NM_020599	20363	Sepp1	13 days embryo head riken cdna clone:3110056m11
3 NM_009155			
3 NM_009431	27407	Abc2	scleroprotein P, plasma, 1
3 AF213382			
3 BC004728	69746		slp-binding cassette sub-family 1 gen20 member 2 clone mgc:7932; protein abc2
3 AK010555			
3 AK003511	74008		RIKEN cDNA 2410019A14 gene
3 AK018132			KIAA1001 protein [Homo sapiens] 78 %
3 NM_026218	67529		RIKEN cDNA 150003.L01 gene
3 NM_016766	51812	Mcrs1	microsphenide protein clone mgc:5852; nucleolar msp58
3 AK017758			
3 AK010528	57423	Alp52	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit f, isoform 2
3 NM_020582	70568	Cone3	copine III
3 AK017357			
3 AK006410	15002	H2-Ob	Histocompatibility 2 o region beta locus h2-ob
3 NM_010389	67630		T45942 hypothetical protein F5K20.320 (23% Arabidopsis thaliana)
3 AK006211			
3 AK016834	70770		POL2, MOUSE Retrovirus-related POL polypeptide [Contains: Reverse transcriptase; Endonuclease] 32 % M.musculus
3 AK014334	13663	Eiz4	etoposide induced 2.4 mRNA
3 NM_007915			
3 AK004706			
3 AK009847			
3 AK018275	11305	Abca2	slp-binding cassette sub-family a abc1 member 2 abca2
3 NM_023320			
3 NM_007379			
3 AK004078	213054	Gabpb2	GA repeat binding protein, beta 2, p1:AS3950 - AS3950 transcription factor GABP beta 2:1 chain - mouse 100.00 %
3 AK010289	230901		brain cdna clone rnmcb-3968 unnamed protein product
3 AK020406	74057		RIKEN cDNA 4833405D12 gene
3 AB041660			caspase 3, apoptosis related cysteine protease
3 AK016661	12367	Casp3	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit c (subunit 9), isoform 2
3 AK014231	67942	Alp52	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit c (subunit 9), isoform 2
3 NM_026468			
3 AK014265			
3 AK013485	71027		adult male testis riken cdna clone:4933401b01
3 AK016597			
3 NM_011160	106583	Rbm16	RNA binding motif protein 16
3 BC023302	28465	Zfp146	zinc finger protein 146 zfp146
3 NM_011890			
3 BC003901	12333	Capn1	microdial calcium activated neutral protease large subunit capn1 protease mu-calpain; calpain I capn1
3 NM_007600	11764	Ap1b1	adaptor protein complex ap-1 beta subunit clone mgc:5850; ap1b1
3 NM_007454			

FIGURE 6-5

Cluster Access	Locus Gene	Description
3 NM_020585	57437	ASPC041 protein [95% Homo sapiens]
3 AK006727	67003	adult male testis riken cDNA clone:170004820; clone:4933432e16
3 NM_019752	64704 Pfs325	serine protease hira2 escherichia coli hira; orn hira-like protein
3 NM_010757	17135 Mafk	v-naf musculosarcomatous fibrosarcoma oncogene family protein k avian mafk; erythroid transcription factor nf-e2 subunit
3 AF071068		
3 AK011385	14433 Gapd	glyceraldehyde-3-phosphate dehydrogenase
3 NM_008084	58187 Cldn10	claudin-10
3 NM_021386		
3 AK021021		
3 BC010810		
3 AK016953	12421 Cc1	cc1 coiled-coil protein nuclear; partial lxp180
3 NM_005826	22668 Zfp162	zinc finger protein 162
3 NM_011750	18002 Ncd08	neural precursor cell expressed developmentally down-regulated ncd8
3 NM_008683	12017 Bag1	Bcl2-associated atihomogene 1
3 NM_009736	66552	putative intramembrane cleaving protease [81% Homo sapiens]
3 NM_023220	11771 Ap2a1	alpha-adaplin a a sa 1-977
3 NM_007458		
3 NM_025982	71971	RIKEN cDNA 241003H12 gene
3 AK010358		RIKEN cDNA 573049JB19 [Mus musculus] 69.05 %
4 AK007557	59173 Tmod3	ubiquitous tropomodulin u-tmod actin filament pointed-end capping protein; 3 tmod3
4 NM_010563	50875 Hccs	holocytochrome c synthetase
4 NM_008190	15159 Hccs	hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 7
4 AF277718	101502 Hsd3b7	RIKEN cDNA 4933404M02 gene
4 AK017113	66748	
4 AK018886	83946 Phip	pleckstrin homology domain interacting protein
4 NM_031879	12895 Cpl1b	carbamate palmitoyltransferase 1, muscle
4 NM_009948	13831 Epc1	enhancer of polycomb homolog 1 (Drosophila)
4 AK017858	20731 Spink4	ISK4_MOUSE Serine protease inhibitor Kazal-type 4 precursor (Peptide PEC-50 homolog) (MPOG50 protein 100 % /
4 Y11505		RIKEN cDNA 241003K01 gene
4 AK011728	67829	small chemokine (C-C motif) ligand 11
4 NM_011330	20292 Cc11	calcium channel, voltage-dependent, alpha 11 subunit
4 AK026384	100655 Caca11	
4 AK008468		
4 NM_026300	74694	T48688 hypothetical protein DKFZp761D1823.1 (35% human)
4 AK015700	26433 Pldc3	phosphatidylcholine, 2-oxoglutarate 5-diacylglycerol 3
4 NM_011962	67358	RIKEN cDNA 1700093K21 [100% Mus musculus]
4 NM_026105	23965 Odg3	odd od/en-m homolog 3 drosophila odg3
4 NM_011857	14378 Gdpccs	glucose-6-phosphatase, catalytic, related, islet specific glucose-6-phosphatase [Mus musculus] 100 %
4 NM_021331	19374 Rag2	recombination activating gene 2
4 NM_009020	13524 Adsm18	disintegrin and metalloprotease domain 18
4 NM_010084	110782 Aldh5a1	adult male testis riken cDNA clone:4932702p03
4 AK016580	74016	T17260 hypothetical protein DKFZp727G051.1 - (90% human)
4 AK014380		ras homolog gene family, member G
4 NM_019566	56212 Arhg	
4 AK002703		
4 NM_008059		
4 NM_026119	80889 Mesoc1	mesoderm development candidate 1
4 NM_030705	13370 Dio1	adult male kidney riken cDNA clone:081001120; deiodinase iodothyronine type I dio1
4 NM_007860		
4 AK004919	12363 Casp11	caspase 11 casp11; caspase-11
4 NM_007609		
4 AK014199	12122 Bid	BH3 interacting domain death agonist
4 NM_007544	21985 Tpd52	tumor protein D52
4 NM_009412	63492 Mlze	melanoma-derived leucine zipper, extra-nuclear factor
4 NM_031378		
4 NM_010062		
4 AK010807		
4 AK018485	59181 Il20	interleukin 20 il20
5 NM_021580	76964	RIKEN cDNA 261002B024 gene
5 AK011591		

FIGURE 6-6

cluster analysis I
lung cancer
Midbrain

Cluster Access	Locus	Gene	Description
5 AK018452	64452	SLC5A4a	solute carrier family 5, member 4a
5 AF251261			
5 AK014709			
5 AK007941			
5 NM_019849	67467		RIKEN cDNA 1200011118 gene
5 NM_026177			
5 NM_019519			
5 NM_025459			
5 NM_007480	11844	Arf5	adp-ribosylation factor 5 arf5
5 NM_011828			
5 AF217002			
5 NM_010811	17423	Nds32	glucosaminyl n-deacetylase / n-sulfotransferase dual enzyme activities; heparan sulfate n-deacetylase/n-sulfotransferase
5 NM_010268			
5 NM_021325	57781	Mox2r	antigen identified by monoclonal antibody MRC OX-2 recepto
5 NM_009190	20479	Vps4b	skd1 protein putative alpsase nem-sensitive fusion nsf swiss-prot accession number p18708 cdc48p ptr a339877 pas; vacuolar sorting 4b yeast done mcg-6072
5 BC002148			
5 NM_011986			
5 NM_025591	66488		RIKEN cDNA 2010309EZ1 gene
5 NM_030251	80283	Abib1	ankyrin repeat and B1B (POZ) domain containing 1
5 AK007368			
5 NM_020508			
5 NM_008737	18186	Nrp	neuropilin
5 AK013041	69940		Sec3-like; homolog of yeast exocyst protein Sec3p [Homo sapiens] 96 %
5 AK003217			
5 AK017789	70661		SNIL_HUMAN Probable serine/threonine protein kinase SNF1LK [55% human]
5 NM_008217	15118	Hes3	hyaluronan synthase 3 has3
5 NM_033077			
5 NM_008556	18611	Pea15	phosphoprotein enriched in astrocytes 15
5 NM_028732	74048		RIKEN cDNA 4632428N05 gene
5 AF090691	13012	Cst8	cystatin B (cystatin-related epididymal spermalogenic)
5 X98456			M. musculus ORF1 and ORF2 genes
5 AB037596	14538	Gcn12	glucosaminyltransferase, branching enzyme
5 AK011480	72194		RIKEN cDNA 2610020C11 gene
5 NM_008260	15377	Foxa3	forkhead box a3 foxa3
5 AK011565	69904		RIKEN cDNA 2610027F03 gene
5 AK018093			
5 NM_025295			
5 BC017127			
5 AK005930			
5 AK005878			
5 NM_010289	14810	Gja10	gap junction membrane channel protein alpha 10
5 NM_009539			
5 NM_018764	54216	Podh7	protocadherin podh7
5 NM_021537			
5 NM_021452	58802	Kcnmb4	potassium large conductance calcium-activated channel subfamily beta member konmb4
5 NM_025597			
5 NM_010060	13411	Dnahc11	dynein axon heavy chain 11 dnahc11
5 AK005564			
6 NM_011128			
6 NM_022014			
6 NM_025865			
6 NM_010482	15551	Htr1b	5-hydroxytryptamine (serotonin) receptor 1B
6 NM_026518			
6 AK003792			
6 NM_009215	20604	Smed1	preprosomatostatin
6 NM_019445	54418	Fmn2	formin 2
6 NM_080560			
6 AK020538	77397		Lysozyme C, type M precursor (1,4-beta-N-acetylmuramidase C) (62% Mus musculus)
6 AF057287			
6 NM_030706	80890	Trim2	inoporin motif protein trim2

FIGURE 6-7

cluster analysis 1
lung cancer
Midbrain

Cluster Access	Locus	Gene	Description
6 AK006019			
6 AK017054			
6 NM_025583			
6 NM_008450	10593	Kns2	kinesin 2
6 AK003207			
6 NM_011968	26441	Psmc4	proteasome proteasome macropain subunit alpha type 4 clone mpc:5640; psmc4
6 NM_008479	16768	Lsg3	lymphocyte-activation gene 3
6 NM_009527			
6 AK007508	69106		stomatin-like 1; stomatin-like protein 1(79% human)
6 AK018473			
6 AJ131821	11938	Alp2a2	sarcolendoplasmic reticulum ca2+ atpase serca2b
6 NM_024288			
6 AK019388	77134		Mus musculus 12 days embryo head cDNA, RIKEN full-length enriched library, clone:3010025E17 product: HETEROGENEOUS NUCLEAR RIBONUCLEOPROTEIN A0 (HNRNP A0) homolog [Homo sa
6 NM_008078			
6 AK015509	74901		RIKEN cDNA 493046SM17 gene
6 NM_015806	50772	Mapk6	mitogen-activated protein kinase 6
6 AK012084	28107		10 days embryo riken cDNA clone:2610509c22
6 AK007262			
6 AK004171	68792		sushi-repeat protein [Homo sapiens] 93 %
6 AK016162			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930557G23 product: homeodomain Interacting protein kinase 1
6 AY013759			
6 BC011211			
6 NM_011521	20971	Sdc4	syndecan 4 clone mpc:11456; ryudocan core protein
6 BC004835	236519		hypothetical protein FLJ12806 [Homo sapiens] 97 % / 305 aa
6 NM_008098	14489	Mltn	myotrophin
6 BC005581			
6 NM_007883			
6 AK014599	77042		Similar to sperm adhesion molecule 1 (PH-20 hyaluronidase, zona pellucida binding) [45% Homo sapiens]
6 NM_016793	109889	Zfp98	zinc finger protein 121 zfp121
6 NM_053156			
6 AF282303			
6 NM_019694	56384	Leim1	leucine zipper-EF hand containing transmembrane protein 1
6 AF119384	170717		CAMP [Mus musculus] 100 %
6 NM_007920	13709	Ejfi	eis-family transcription factor eif-1
6 AK009114			
6 AK020344	77363		RIKEN cDNA 9530004P13 gene
6 AK003871	19326	Rab11b	rab11b member ras oncogene family
6 NM_053115	93732	Acox2	acyl-Coenzyme A oxidase 2, branched chain
6 NM_021283	18189	Ii4	interleukin 4
6 NM_025774			
7 NM_010722	16907	Lmb2	lamin b2
7 NM_011697	22340	Vegfb	vascular endothelial growth factor B
7 AK017800	224796	Clic5	chloride intracellular channel 5
7 NM_008004	14171	Fgf17	fibroblast growth factor 17
7 NM_026100	67344		RIKEN cDNA 170005SO19
7 AK012326	52323		kelch-like 3 (Drosophila); kelch (Drosophila)-like 3 [34% Homo sapiens]
7 NM_028785	74146		RIKEN cDNA 1200017A24 gene
7 NM_018763	54723	Tip39	turfelin-interacting protein 39 tip39
7 AK007150	77036		hypothetical protein FLJ11767 (98% human)
7 NM_021309	27371	Sh2d2a	SH2 domain protein 2A
7 BC010333			
7 NM_011917	24128	Xm2	5-3 exonuclease 2
7 NM_011545	21412	Taf21	transcription factor 21
7 NM_019823	16439	Itp2	inositol 1,4,5-trisphosphate receptor 2
7 NM_021434			
7 AK015384			
7 AK019600			
7 NM_025327	66059		18 days embryo riken cDNA clone:1110002K21
7 NM_019511			

FIGURE 6-8

Cluster Access	Locus	Gene	Description
7 AF415213	20698	Sphk1	sphingosine kinase 1
7 AK003575	69064		RIKEN cDNA 18 0014F 10 gene
7 NM_030717	80907	Lectb	serine beta lactamase-like protein lact-1
7 AK007807	67916	Ppa2b	phosphatidic acid phosphatase type 2B
7 NM_000555	64051	Sr2a	synaptic vesicle glycoprotein 2 a
7 NM_022030	58170	hac	amiloride-sensitive sodium channel
7 NM_021370	17257	Meop2	methyl O6 binding protein 2
7 NM_010788	54488	1116	interleukin 1 family, member 6
7 NM_019450			
7 NM_026027			
7 AK009798	22184	U2af1-r32	U2 small nuclear ribonucleoprotein auxiliary factor (U2AF), related sequence 2
7 NM_009453			
7 NM_010174	17087	Ly98	esop1 cytokine secreted protein
7 NM_016923	21825	Thbs1	thrombospondin 1
7 NM_011580			
7 NM_007607			
7 NM_009285	20855	Sic	stanniocalcin
7 NM_011266	19727	Rfxank	regulatory factor x-associated ankyrin-containing protein rfxank; adp3p1r M-1 M1
7 NM_020566	57431	Dhnrj4	multiple endocrine neoplasia type candidate protein number 18 dhaf family protein mcg18; adult male small intestine riken cdna clone:2010301J22
7 NM_008904	19017	Ppargc1	peroxisome proliferative activated receptor, gamma, coactivator 1
8 NM_017391	53881	Sic5a3	solute carrier family 5 (inositol transporters), member 3
8 AF262301	258488	MOR224-4	olfactory receptor MOR224-4
8 AK016959	71306		AS6745 microtubulin-associated protein 3 - human 58 %
8 NM_026925	69060		pancreatic lipase [Homo sapiens] 72 %
8 AF343068			
8 NM_008339	15985	Igb	immunoglobulin-associated beta Igb
8 AK006375	75556		RIKEN cDNA 1700026D08 gene
8 NM_008956	19205	Pibp1	poly(pyrimidine tract binding protein 1
8 NM_016856	51786	Cpsf2	cleavage and polyadenylation specific factor 2 100kd subunit clone image:3489003; cpsf2
8 X53802			
8 NM_008156	14756	Gpfd1	glycosylphosphatidylinositol-specific phospholipase d precursor gpfd1 gp-pfd; adult male liver riken cdna clone:1300010p06
8 NM_026180	67470	Abnpg8	adult male liver riken cdna clone:1300000c16
8 NM_009468			
8 AF332087			
8 NM_031248	83409	Mapbpip	nitrogen activated protein binding interacting mapbpip
8 NM_011561	21685	Tdg	thymine DNA glycosylase
8 NM_033567	94047	Cecce6	cat eye syndrome chromosome region, candidate 6 homolog (human)
8 AK015642	75038		CERU_MOUSE CERULOPLASMIN PRECURSOR (FERROXIDASE) (96% Mus musculus)
8 NM_008508			
8 AK020330			
8 NM_021432	58243		hypothetical protein, MNCB-0385 [Mus musculus]
8 NM_018805	54710	Hs3s13b	d-glycosaminyl 3-O-sulfotransferase-3b 3-osl-3b
8 AJ133523			
8 NM_010094	13590	Ehbf	endometrial bleeding associated factor
8 AF230395	22670	Tnn26	tripartite motif protein tnn26 alpha
8 NM_033269	12671	Chrm3	ACM3_MOUSE Muscarinic acetylcholine receptor M3 (Mm3 mAChR) 100 % /
8 NM_021611			
8 NM_011025	18429	Oxt	oxytocin-neurophysin i
8 AK009646	71900		
8 AY014997			
8 M84429	109880	Braf	Braf transforming gene
8 AK017705	70573		hypothetical protein FLJ10560 [82.88% Homo sapiens]
8 NM_011429			
8 AK013874			
8 NM_007502	11933	Alp1b3	alk-alkase beta-3 subunit alp1b3
8 AK014128	207615		T46442 hypothetical protein DNFZp434F2427.1 - (96.57% human)
8 BC018297			
8 AK015166	74902		plecin 1, intermediate filament binding protein, 500kD [Homo sapiens] 25.74 %
8 NM_006558	17187	Max	bhlh2 protein myn putative

FIGURE 6-9

Cluster Access	Locus	Gene	Description
8 NM_025460	108014	Srsf9	13 days embryo male testis riken cdna clone:6030489x23; 10 clone:2610029m16
8 NM_016709	75168		adult male testis riken cdna clone:4930533b18
8 NM_023764	12296	Caeb2	calcium channel, voltage-dependent, beta 2 subunit
8 NM_025573	27414	Cnfr	guanine nucleotide exchange factor (RCC1 related)
8 AK019873	67889		RIKEN cDNA 2010004P11 gene
8 NM_011615	27374		Jak-binding protein 1
8 NM_015952	17749	Mt1a	metallothionein-I activator
8 L20343	15931	lfs	iduronate sulfatase lfs
8 NM_027945	17877	Myf5	myogenic factor 5
8 NM_013789	80859	Mail	molecule possessing ankyrin-repeats induced by lipopolysaccharide mail
8 NM_026434	22021	Tpsl1	protein-tyrosine sulfotransferase tpsl1
8 AF167573	24015	Abce1	ATP-binding cassette, sub-family E (OABP), member 1
8 S63756	18013	Neurod2	neurogenic differentiation 2 neurod2; bhlh protein
8 NM_010499	17344	Miz1	Max-interacting zinc finger
8 NM_007567	67576		RIKEN cDNA 4930429821 gene
8 NM_008655	21898	Tlr4	tol-like receptor 4
8 NM_030612	71904		RIKEN cDNA 2310021M12 gene
8 AK016041	67107		RIKEN cDNA 2900001A12
8 NM_013837	20811	Slubp2	synixin binding protein 2
8 NM_015751	24037	Sh3y1	Sh3 domain YSC-like 1
8 NM_010895	19411	Rarg	retinoic acid receptor gamma mrar-gamma-a
9 NM_008602	22325	Vav2	vav2 oncogene
9 NM_025249	13805	Eng	edg endoglin lgr-beta receptor III homolog; eng
9 AK014533	54120	Semcap2	semaphorin cytoplasmic domain associated protein 2
9 AK009450	20211	Sas4	serum amyloid a sas4 pseudogene and sas5
9 NM_011851	58242	Nud11	nudix (nucleoside diphosphate linked moiety X)-type motif 11
9 NM_025971			
9 NM_026125			
9 NM_011503			
9 NM_009426			
9 AJ252147			
9 AK007060			
9 NM_013709			
9 AK014579			
9 NM_011244			
9 BC005604			
9 NM_009500			
9 NM_007832			
9 NM_016867			
9 AK015925			
9 NM_026312			
9 NM_011316			
9 AB041576			
9 AK017510			
9 BC005467			
9 NM_009788			
9 NM_026423			
9 NM_026437			
9 NM_021292			
9 NM_008842			
9 NM_010501			
9 NM_026088			
9 NM_025694			
9 AY044265			
9 NM_016681			
9 NM_007466			
9 NM_021305			
9 AK014912			
9 NM_011588			
9 AK006009			

FIGURE 6-10

cluster analysis I
lung cancer
Midbrain

Cluster Access	Locus	Gene	Description
9 NM_009366	21807	Tgfb14	transforming growth factor beta 1 induced transcript 4
9 NM_009530	22589	Xip	atrx protein putative alipase and helicase
9 AK014175	73205		Mus musculus 13 days embryo head cDNA, RIKEN full-length enriched library, clone:311004302.1 product:unknown EST
9 AB047323			Mus musculus gene for Con 17p, complete cds
9 AK004827	269378	Ahcy	S-adenosylhomocysteine hydrolase
9 NM_016661			
9 NM_025640	12814	Ccl11a1	a1x1 collagen chain
9 NM_007729	76582		Similar to Rtn binding protein 11 (IPO11) [95% Homo sapiens]
9 AK010877	50934	Slc7a8	glycoprotein-associated amino acid transporter lat2
9 NM_016972			
9 AK016624	21341	Tat1c	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, C
9 NM_021441			
9 AK014309	73747		RIKEN cDNA 1110034G24 gene
9 AK004090	67112	Fg22	fibroblast growth factor 22
9 AK008922			
9 NM_011483	11535	Adm	preproadrenomedullin; adrenomedullin adm
9 NM_009627			
9 AF330257			
9 AK005253			
9 NM_019477			
9 235187	12829	Col4a4	balb/c collagen iv alpha 4 chain; col4a4
9 NM_011251	19654	Rbm6	RNA binding motif protein 6
9 NM_010797	17318	Midl1	midline 1
9 NM_024449			
9 NM_009228	20648	Sna11	synaptophysin, acidic 1
9 AK017596			
9 NM_007651	12508	Cd53	cd53 antigen
9 NM_008548	17155	Man1a	mannosidase alpha man 1a
9 AK021330			
9 AF083878	13731	Emp2	epithelial membrane protein 2
9 NM_009328	21407	Tcf15	paraxial basic-helix-loop-helix protein
9 NM_009112	20184	S100a10	calpactin I light chain p11
9 AB041601			
9 NM_025494	66335	Alpbv1c1	ATPase, H+ transporting, V1 subunit C, isoform 1
9 NM_018775	54610	Tbc1d8	TBC1 domain family, member 8
9 NM_016756	12566	Cdk2	cyclin-dependent kinase 2 [Mus musculus] 100 %
9 NM_010428	15227	For1a	forkhead box F1a
9 NM_019720	56368	Tsp10	tumor suppressor region 10
9 NM_010055	13393	Dxc3	d1x-7 distal-less homeobox distal-less this sequence comes from table 2; dxc-3
9 BC022339			
9 NM_024291			
9 NM_023422			
9 NM_025725	66717		RIKEN cDNA 4821513E08 [Mus musculus] 100 %
9 NM_023913	78943	Em1	endoplasmic reticulum (ER) to nucleus signalling
10 NM_019802	56316	Gpxc	gamma-glutamyl carboxylase
10 NM_025951			
10 AV026606	114566	Krt2-20	ref:NP_149022.2 - keratin, hair, basic, 2; hard keratin, type II, 2 [Homo sapiens] 85 %
10 L34876			
10 AK020723	77764		2004395A melanin-concentrating hormone (100% Mus musculus)
10 NM_018912	229815	Plec3	protein inhibitor of activated STAT 3
10 NM_011844			
10 AK007241	76851		adult male testis riken cdna clone:1700122c11
10 NM_013945	26563	Ror1	receptor tyrosine kinase-like orphan ror1 - ROR1_MOUSE Tyrosine-protein kinase transmembrane receptor ROR1 precursor [Neurotrophic tyrosine kina 100 %
10 NM_008369	16188	I37a	il-3 receptor alpha subunit
10 AK003266			
10 NM_026232	67554		RIKEN cDNA 4933433D23 gene
10 BC004785	68979		T14789 hypothetical protein DKFZp596k0724.1 (75% human)
10 AK007640	46501		HSPC166 protein [Homo sapiens] 89 %
10 NM_031168	18180	Ifi6	interferon if6
10 NM_010125			

FIGURE 6-11

Cluster Access	Locus	Gene	Description
10 NM_008890			
10 NM_025788			
10 AK015245	74626		RIKEN cDNA 4930429020 gene
10 NM_025771	66797	Chnlp2	connalrin associated protein-like 2
10 NM_007711	12725	Clnx3	chloride channel protein clnx3
10 AJ288061			
10 NM_030680	75646		DKFZP564C013 protein; novel retinal pigment epithelial gene; novel retinal pigment epithelial gene 84 %
10 NM_019955	56532	Ripk3	receptor interacting protein rip3
10 NM_009548	22671	Zfp179	zinc finger protein 179
10 AK004582	71718		T12514 hypothetical protein DKFZp434A073.1 - human 74 %
10 NM_011823	23890	Gpr34	adult male corpus striatum riken cdna clone:cd30004111; g protein-coupled receptor 34 gpr34
10 AK009282	71897		RIKEN cDNA 2310010M24 gene
10 AK009487	67863	Sic23a11	solute carrier family 25 (mitochondrial carrier; oxoglutarate carrier), member 11
10 BC002307	27878		SPT3-associated factor 42 [95% Homo sapiens]
10 NM_010836	17703	Max3	max3 like drosophila melanogaster muscle segment homeobox mesh protein encoded by genbank accession number U33319
10 NM_016704			
10 NM_009124			
10 AK010014	76933		TLH29 protein precursor [Homo sapiens] 63 %
10 NM_007966	14028	Evx1	even skipped homeotic homolog evx1
10 NM_008903	19012	Ppap2a	phosphatidic acid phosphatase 2a ppap2a
10 NM_007782	12986	Csf3r	colony stimulating factor 3 receptor granulocyte csf3r
10 NM_023197			
10 AK005962	69379		Similar to CO8G_HUMAN Complement component C8 gamma chain precursor 73 % human
10 NM_007653	12512	Cd63	cd63 homologue of cd63me491; antigen clone mpc-7123
10 NM_026092	87328		riken cdna 170003802 170003802zik
10 AK007327			
10 AK010400			
10 AK005519			
10 BC005656			
10 NM_025975			
10 AY033901			
10 NM_026578	68936		ref NP_478062.1 - chromosome 21 open reading frame 51 [Homo sapiens] 82 %
10 NM_031173	68147	Nola1	nucleolar protein family A, member 1 (HACA small nuclear RNPs)
10 AF375046			
10 AJ289241	60954	Capn12	calpain 12
10 AK016803	71066		HSF4_MOUSE Heat shock factor protein 4 (HSF 4) (Heat shock transcription factor 4) (HSF4) 33 %
10 AK016846	71188		IQG2_HUMAN Ras GTPase-activating-like protein IQGAP2 77 %
10 NM_008058	14370	Fzd8	putative transmembrane receptor frizzled 8
10 NM_009303	20972	Syngp1	es cells riken cdna clone:2410007m11
10 AK004415	73635		TEBP_MOUSE Telomerase-binding protein t23 (tasp29 co-chaperone) (Progestosterone receptor complex p23) 48 %
10 M35732	20941	Sup2	A40059 seminal vesicle secretory protein IV precursor - mouse (fragment) 100 %
10 NM_012065			
10 NM_007847	12499	Enlpd5	ectonucleoside triphosphate diphosphohydrolase 5
10 NM_008383	16328	Inmp	intracellular protein
10 AK021152			
10 NM_019518	56149	Grasp	brain cdna clone rmcdb-4428 grp1-associated scaffold protein grasp unnamed product
10 NM_031249			
10 AK016549			
10 NM_015818	50785	Hs6s11	heparan sulfate 6-O-sulfotransferase 1
10 AK020831	77794		T00260 hypothetical protein KIAA0605 - human 97 %
10 NM_024287	18346	Rab6	brain cdna clone rmcdb-1660 rab6 member ras oncogene family unnamed protein product
10 AK013937	73090		adult male Hippocampus riken cdna clone:2900092c05
10 NM_008510	16963	Soc1	lympholacilin
11 AK021208	77422		RIKEN cDNA C330018D20 gene
11 NM_025276	14027	Expl	partial owl encephalitin
11 D50366	16579	Klrip3	kappa3 kap3b is its splice variant with a bp insertion containing stop codon.
11 AK015897	75040		RIKEN cDNA 4930504H06 gene
11 NM_024225	69178	Snw5	sorting nexin 5
11 AK015619			
11 AK011578			

FIGURE 6-12

Cluster Access	Locus	Gene	Description	gms. nuclear RNA polymerase I small specific subunit [Mus musculus]	100 %
11 NM_023162	66126		RIKEN CDNA 1110014N07		
11 AK015673					
11 NM_025701					
11 NM_029509					
11 AF168286	76074		RIKEN CDNA 5630443L24 gene		
11 NM_010164					
11 NM_015759					
11 AK006268					
11 BC003249	106628	Tripl10	thyroid hormone receptor interactor 10		
11 L13204	15223	Foxl1	hnr1-3'forward homolog-4 hnr-4 bp 256..303 activation domain region b 508..810 winged helix dna binding		
11 NM_007391					
11 NM_021480	17840	Mup1	major urinary protein 1		
11 AK011413	74603		antigen identified by monoclonal antibody MRC OX-2 receptor (41% Mus musculus)		
11 AK014671	11876	Artn	artemisin		
11 NM_009711	12514	Cd68	macrophage		
11 NM_009853	16835	Ldtr	low density lipoprotein receptor ldr		
11 NM_010700	74768		A39740 sterol 27-monooxygenase (EC 1.14.14.-) cytochrome P450 27, precursor - (74% human)		
11 NM_024264					
11 AK016858					
11 NM_009427	19283	Ptpcz	dcd-1-proteoglycan phosphacan homolog		
11 NM_011219					
11 NM_019432					
11 AK016475	18412	Sqsm1	sequestosome 1		
11 NM_011018	22715	Zfp57	zfp-57		
11 NM_009559					
11 AK016996	80719	Igsi6	immunoglobulin superfamily member Igsi6		
11 NM_030691	21380	Tbx1	t-box transcription factor tbx1		
11 AF326960	20520	Sic22a5	organic cation/carnitine transporter octn2		
11 NM_011396	16161	Il12rb1	interleukin 12 receptor, beta 1		
11 NM_008353					
11 NM_025829					
11 AK011356					
11 NM_011948					
11 AF265091	68659		AD021 protein (88% human)		
11 AK017508					
11 NM_010827					
11 AK006984	76615		S13035 aspartate transaminase (EC 2.6.1.1) - human 40 %		
11 NM_009405	21953	Tnni2	fast fiber tropinin I		
11 AK004206	67282		AD16_HUMAN Protein AD-016 (Protein CGA-116) (p0009) 90 % /		
11 NM_013463	11605	Gla	galactosidase, alpha		
11 NM_021399					
11 AK004401	71797		choondrolin 4-sulfotransferase [Mus musculus] 47 %		
11 Y11717	15400	Hoxa3	hoxa3		
11 NM_013848	27028	Ermap	erythroblast membrane-associated protein		
11 AK007351	69038		chromosome 11 open reading frame 10 [Homo sapiens] 100 %		
11 BC005753	210148	Sca30a6	solute carrier family 30 (zinc transporter), member 6		
11 AK016111	75264		RIKEN CDNA 4930553P13 gene		
11 NM_016818					
11 AF342737					
11 AK002581					
11 AK013580					
11 AK007938					
11 AK004107					
11 AK006525					
11 NM_080433					
11 BC002230					
11 AK014338			similar to hypothetical protein FLJ10008 [Homo sapiens]		
11 NM_022883					
11 NM_007750	12868	Cox8a	adult male kidney riken cdna clone:0610011224		
11 AK012532					

FIGURE 6-13

Cluster Access	Locus	Gene	Description
11 NM_021394	20186	Nr1h4	retinoid x receptor interacting protein rrp14-1no.6 alpha isoform
11 AK010015	13813	Eomes	tor2-1-ox-containing
11 NM_009108	56174	Nagk	N-acetylglucosamine kinase
11 AK020663	26946	Tnp8	receptor-activated calcium channel lrp7 drosophila transient receptor potential protein
11 NM_015819	16780	Lamb3	laminin, beta 3
11 NM_019542	71740	Pvrl4	adult male liver riken cdna clone:1200017115
11 NM_008484	72195		SPTF-associated factor 65 gamma; KIAA0764 gene product; adenocarcinoma antigen ART1 (Homo sapiens) 95 %
11 AK004821	73246	Rassf8	Ras association (RAGDS/RAF-6) domain family 6
11 AK012134	20707	Sp11	serine protease inhibitor 11
11 AK005472	12018	Bak1	bak bcl-2 family member
11 NM_011453			
11 AJ005350			
11 NM_007523			
11 NM_009047			
11 AK015708	81535	Sgpp1	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
11 NM_020750	18131	Notch3	Notch gene homolog 3 (Drosophila)
11 AK007519	12028	Bax	10 11 days embryo riken cdna clone:2810443.m09; bcl2-associated x protein bax
11 NM_008716	13067	Cycl	adult male testis riken cdna clone:1700001d24
11 NM_007527	70804		progesterone membrane binding protein [73% Homo sapiens]
11 NM_00929h			
11 AK014543			
11 NM_013822			
11 AK010717			
11 NM_020514	12300	Cacng2	calcium channel voltage-dependent gamma subunit 2 cacng2
11 NM_007583	76157	Frd1	fric, fringe-like 1 (Drosophila)
11 AK018094			
12 AK016791	16571	Kif4	kinesin heavy chain member kif4
12 NM_024178	67285	Sdcbg10	serologically defined colon cancer antigen 10
12 NM_008446	77125		DVS27-related protein [Homo sapiens] 51 %
12 AK014025			
12 BC003647			
12 NM_011543	57264	Retn	resistin retn
12 NM_022984			
12 AK017851	26565	Pls2g10	phospholipase A2, group X
12 AF210429	18008	Nes	neslin
12 NM_021600			
12 NM_016701	12764	Cnras	cytidine monophospho-N-acetylneuraminic acid synthetase
12 BC017625	16511	Kcnk2	ether-a-go-go-related protein isoform merng la merng
12 AJ065215	20544	Sic5a1	solute carrier family sodium/hydrogen exchanger member sic5a1; clone image:3500839
12 NM_013569			
12 NM_016981			
12 AF302136	71770	Aq2b1	adult male liver riken cdna clone:1300012603
12 AK007731	93587	Cank1a1	casein kinase 1, alpha 1
12 AK004875	66230	Mips28	mitochondrial ribosomal protein S28
12 AK019176	68045		CGI-99 protein [Homo sapiens] 97 %
12 AK011036	11862	Alp10a	ATPase, class V, type 10A
12 AK008080	75185		RIKEN cDNA 4930542N07 gene
12 NM_026528			
12 AF156549			
12 NM_028267			
12 NM_029199			
12 NM_078267			
12 AK018100	56449	Ccda	cold shock domain protein A
12 NM_009367	17152	Mak	male germ cell-associated kinase
12 NM_019638			
12 NM_008547			
12 AK008928			
12 AK010396	78283		ref:NP_116187.1 - hypothetical protein FLJ14503 [Homo sapiens] 71.76 %
12 AK019929			

FIGURE 6-14

cluster analysis I
lung cancer
Midbrain

Cluster Access	Locus	Gene	Description
12 NM_026147	67427	Rps20	day neonate skin riken clone:4632426k06
12 AK010361	72324	Tem7	tumor endothelial marker 7 precursor
12 AK013267	72747		RIKEN cDNA 4930560E09 (Mus musculus 25 %)
12 AK006593	73486		RIKEN cDNA 1700084J12 gene
12 AF242377	170763		ZZ08_HUMAN Zinc finger protein 208 53 %
12 NM_026047			
12 AK009010			
12 BC012853	71963		hypothetical protein FLJ20764 (73% human)
12 AK019494	78261		Mus musculus 0 day neonate skin cDNA, RIKEN full-length enriched library, clone:4632413E21 product:weakly similar to PHOSPHOLIPASE B [Rattus norvegicus]
12 NM_011256	19879	Rdgp2	retinal degeneration B2 homolog (Drosophila)
12 BC005709	229487	Pet1121	PET112-like (yeast)
12 NM_010260	14469	Gbp2	guanylate nucleotide binding protein 2
12 NM_008422	16504	Knc23	Kv3.3 potassium channel protein exon
12 NM_019961	56535	Per3	peroxisomal biogenesis factor 3
12 AK016671	74412	Gle1l	GLE1 RNA export mediator-like (yeast)
12 M36654			very low density lipoprotein receptor
12 NM_013703	22359	Vldlr	

Figure 6-15

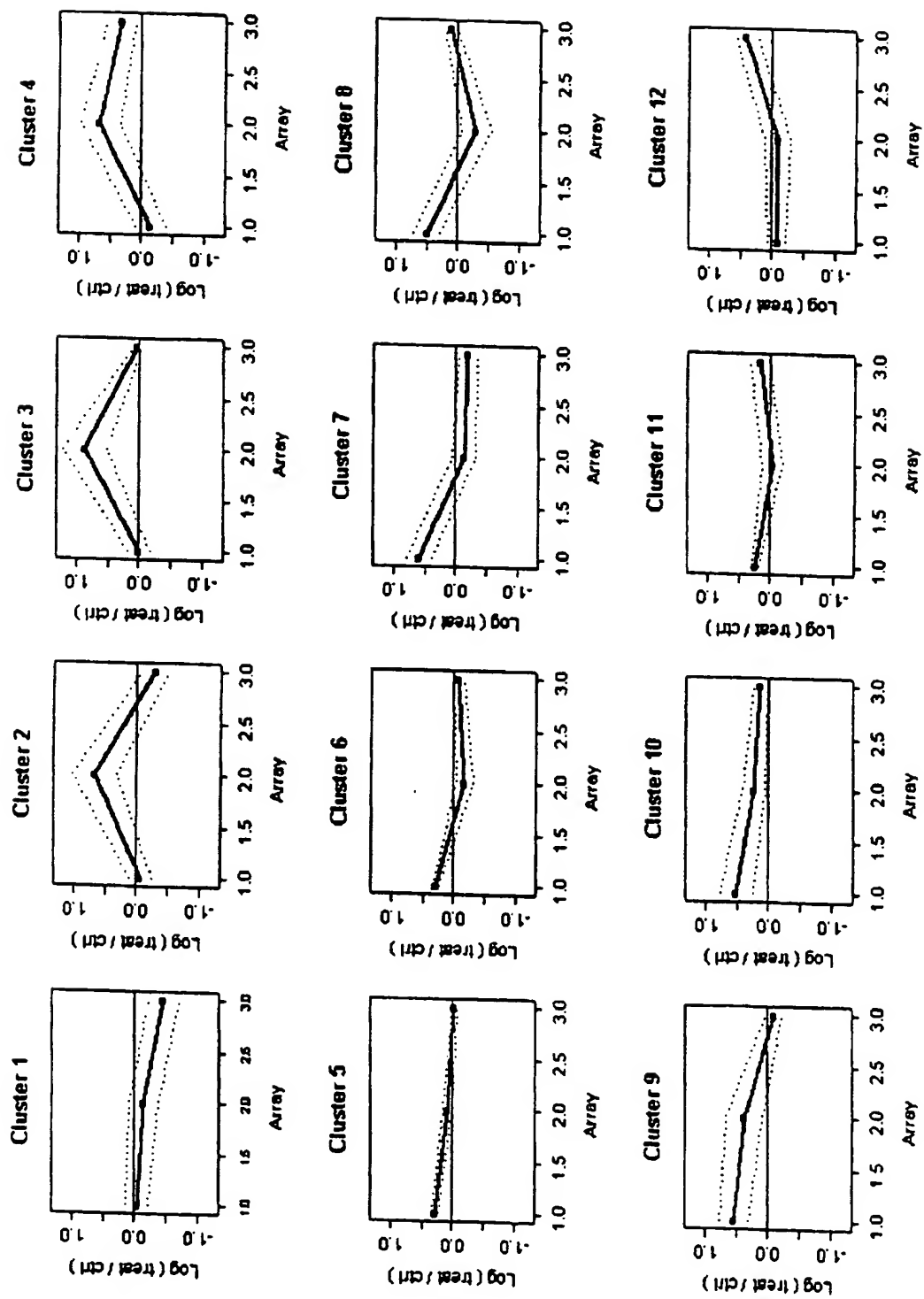


FIGURE 7-1

Cluster	Access	Gene	Description
1	NM_020204	63986 Grnlg	gla maturation factor, gamma
1	NM_013454	11303 Abca1	ATP-binding cassette, sub-family A (ABC1), member 1
1	NM_019965	56709 Dnajb12	mod10 deduced amino acid sequence of Is homologous to c. elegans putative dne] protein z73102 b0035.14, homolog
1	NM_032002	83961 Nrg4	neuregulin 4 nrg4
1	AK006472	74239	Rab6-interacting protein 2 [Mus musculus] 23.36 %
1	AK010800	76797	Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
1	NM_020606	57342 Parva	parvin, alpha
1	AK016707	74420	RIKEN cDNA 4933406P04 gene
1	NM_023175	53633	Nit protein 2 [89% Homo sapiens]
1	AK007013	74282	similar to keratin associated protein 4.7 [31% Homo sapiens]
1	AK009088	69533	Tetraspan NET-5 (95% human)
1	AK012571	66109	culin 2
1	AK016520	71745 Cul2	T46611 CL288 protein - rat (31 % R.norvegicus)
1	AF358257	70967	hypothetical protein MGC15435 [Homo sapiens] 51 %
1	AK002774	72114	CD9 antigen
1	NM_007657	12527 Cdf9	
1	AF448604	72162 Ddx36	fibroblast activation protein
1	NM_007986	14089 Fap	gonosecond gsc
1	NM_010351	14836 Gsc	capz1 noncaldesmon coat protein zeta-coop
1	NM_019817	56447 Capz1	C-terminal PDZ domain ligand of neuronal nitric oxide synthase
1	AK018149	70729 Capon	vaccinia related kinase 2
1	AK012664	69922 Vha2	Mus musculus 10 days embryo whole body cDNA, RIKEN
1	AK011324	58804 Cdc42ep	CDC42 effector protein (Rho GTPase binding) 5
1	NM_021454	16699 Krip13	Keratin associated protein 13
2	NM_010671	14211 Sme211	SMC2 structural maintenance of chromosomes 2-like 1 (yeast)
2	NM_053168	94091 Trfm11	tripartite motif protein trfm11
2	NM_008517	16983 Udh4	leukotiene A4 hydrolase
2	NM_013706	23833 Cde2	CDE2 antigen
2	AK004934	71774	Similar to APXL_HUMAN Apical-like protein (APXL protein) human 28 %
2	NM_029091	74764	likely ortholog of kinesin light chain 2 [89% Homo sapiens]
2	NM_018758	57267 Apb3	amyloid beta (A4) precursor protein-binding, family A, member 3
2	NM_008837	18693 Pkcalbp	protein kinase C, alpha binding protein
2	AK015942	75106	RIKEN cDNA 4930519F16 gene
2	AK016148	75342	RIKEN cDNA 4930556J24 gene
3	NM_026494	106564	hypothetical protein FLJ11838 [Homo sapiens] 87%
3	NM_053011	84217 Lrp1b	low density lipoprotein-related protein 1B (deleted in tumors)
3	NM_013695	30055 Timm9	translocase of inner mitochondrial membrane 9 homolog (yeast)
3	NM_030713	80902 Zfp202	zinc finger 202 m1 zinc202 scan-karab-zinc protein ant202-m1
3	NM_030748	81500 Sli1	Sli1
3	NM_011992	26617 Rct2	reticulocalbin 2
3	NM_009237	20675 Sox3	SRY-box containing gene 3
3	NM_026766	69565 Mps18a	mitochondrial ribosomal protein S18A
3	NM_007408	11520 Adip	adipose differentiation related protein
3	AK016487	70980	RIKEN cDNA 4931431F19 gene
3	AK012075	72145 Wdy3	WD repeat and FYVE domain containing 3
3	NM_008690	18037 Ntkbe	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, epsilon
3	AK013202	20467 Sox3b	transcriptional regulator, SIN3B (yeast)
3	NM_011184	19167 Puma3	proliferosome (prosome, macropain) subunit, alpha type 3
3	BC016549	72434 C4.4a	GPI-anchored metastasis-associated protein homolog
3	NM_021406	58217 Trem1	inhibiting receptor expressed on myeloid cells 1
3	AK011897	72495	RIKEN cDNA 2610206C17 gene
3	NM_011374	20449 Sali8a	alpha 28-sialyltransferase gD3 synthase putative
3	AK010577	76559	Similar to hypothetical protein FLJ10242 [95% Homo sapiens]
3	NM_026613	68201	hypothetical protein MGC14827 (85% human)
3	NM_009757	12155 Brnp15	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 brnp15
3	AK019546	78548	Mus musculus 8 days neonate head cDNA, RIKEN full-length enriched library, clone:5430417C01 product: hypothetical protein
3	NM_010582	16425 Ubr2	inter-alpha trypsin inhibitor, heavy chain 2
3	NM_018789	17127 Madh3	mad homolog 3 drosophila madh3; msnad3
3	NM_008814	12373 Csaq2	caldesmon 2
3	AK021160	77478	Mus musculus adult male corpus stitutum cDNA, RIKEN full-length enriched library, clone:C000048.01 product: hypothetical protein
4	NM_007574	12262 C1og	complement component 1, q subcomponent, gamma polypeptide

FIGURE 7-2

Cluster	Access	Locs	Gene	Description
4	AK0190095	76837		similar to p17:100322 - 100322 hypothetical protein KIAA0542 - human 62 %
4	AK017382	75736		BCL2-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
4	AF343752	77053	Unc84a	unc-84 homolog A (C. elegans)
4	AK020050	77113	Ki62	sp:095198 - KHL2_HUMAN Ketch-like protein 2 (Actin-binding protein Mayven) 98 %
4	NM_010909	18038	Nbab1	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
4	NM_008550	17160	Men2b2	mannosidase 2, alpha B2
4	NM_011659	22160	Twist1	twist gene homolog 1 (Drosophila)
4	AK013432	67608		Similar to nuclear prelamin A recognition factor, isoform A [84% Homo sapiens]
4	NM_021496	58998	Pvt3	poltovirus receptor-related 3
4	NM_023517	69583	Trsf13	tumor necrosis factor (ligand) superfamily, member 13
4	NM_023217	68522		PGP1_HUMAN Probable pyruvate-carboxylate peptidase (5-oxopropyl-peptidase) (Pyroglutaryl-peptidase 95 %
4	NM_013908	30839	Flaw5	F-box and WD-40 domain protein 5
4	X72307	15234	Hgf	hepatocyte growth factor
4	NM_013728	27216	Ohr154	olfactory receptor 154
4	AK017530	70502		RIKEN cDNA 5730409E15 gene
4	NM_025316	66046	Ndu65	NADH dehydrogenase (ubiquinone) 1 beta subcomplex
4	M12289	17885	Myh6	perinatal skeletal myosin heavy chain 3 end
4	AK007540	69769		hypothetical protein FLJ23467 [Homo sapiens] 93 %
5	NM_026318	67693		Huntingtin interacting protein K; hypothetical protein [Homo sapiens] 99
5	NM_023755	81879	Cnr1	transcription repressor <i>crb-1</i> developmentally regulated related to the <i>ca2</i> family of factors
5	NM_008554	17175	Asd2	achaele-scute complex homolog-like 2 (Drosophila)
5	AK019522	78783	Brp1	bromodomains and PHD finger containing, 1, p1r-JC2069 - JC2069 zinc-finger protein, BR140 - human 97.77 %
5	AK014490	73130		CAOJ_HUMAN Protein CG1-100 precursor (89% human)
5	NM_027170	68686		JC5547 high sulfur protein B2E - rat 37 %
5	NM_026309	67678		LSM3_HUMAN U6 snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
5	NM_008301	15312	Hsp62	heat shock protein 2
5	NM_024465	76192		RIKEN cDNA 6330583M11 gene
5	AK004076	68036		HSPC038 protein [Homo sapiens] 100 %
6	NM_008351	18159	It2a	Interleukin 12 p35 subunit
6	NM_008899	18992	Pou3f2	POU domain, class 3, transcription factor 2
6	AK010428	71956		Z147_MOUSE Zinc finger protein 147 (Estrogen responsive finger protein) (Efp) 32 %
6	AK007245	68107		RIKEN cDNA 1700051C09 gene
6	BC013716	15499	Hs1	heat shock factor 1
6	AK011654	70420		Mus musculus 10 days embryo whole body cDNA, RIKEN full-length enriched library, clone:2610034B18 product: hypothetical protein
6	AK004371	68895		RAP2A, member of RAS oncogene family; RAP2, member of RAS oncogene family (K-REV) [Homo sapiens] 38 %
6	NM_011622	21868	Torn1	target of myb1 homolog (chicken)
6	NM_010425	15221	Foxd3	forkhead box D3
6	AK014905	70892		T12515 hypothetical protein DKFZp434B103.1 - (28% human)
6	AK017464	73747		Sestm 3 (100% Mus musculus)
6	NM_010250	14394	Gabra1	gamma-aminobutyric acid GABA-A receptor subunit alpha
6	AK009858	77039		RIKEN cDNA 2310046M24 gene
6	BC004064	20682	Sot9	SRY-box containing gene 9
6	NM_011165	19110	Ptpn9	protein-tyrosine phosphatase 9
6	NM_011919	26356	Imp1	inhibitor of growth family, member 1
6	AB018421	13117	Cyp4a10	adult male kidney (iken cDNA clone)0610011d16; cyp4a10 cytochrome p-450
6	NM_028120	72140		RIKEN cDNA 2610507L03 [Mus musculus] 100 %
6	NM_009509	22349	Vp	villin
7	NM_007442	11695	Aux4	auxiliase 4
7	NM_009409	16431	Itih2a	integral membrane protein 2A
7	AK009644	70392	Asb12	ankyrin repeat and SOCS box-containing protein 12
7	NM_007688	13543	Dm2	dishevelled 2 dish homolog drosophila dm2
7	NM_025844	66917	Chordc1	cysteine and histidine-rich domain (CHORD)-containing, zinc-binding protein 1
7	NM_019685	56505	Rund1	Run6-like protein 1
7	NM_009537	22632	Yy1	YY1 transcription factor
7	AK010963	70312		hypothetical protein R31449_3 - human (fragment) (89% human)
7	AK014702	74589		Similar to KHL1_MOUSE Ketch-like protein 1 30%
7	NM_010916	18071	Nthh1	resistent helix loop helix 1
7	NM_011552	21453	Tcof1	Treacher Collins Franceschetti syndrome 1, homolog
7	NM_026640	107373		expressed sequence AWA13625
7	NM_009763	12182	Bst1	bone marrow stromal cell antigen 1
7	AF233580	107382	Bms1	breast cancer metastasis-suppressor 1
7	NM_007549	12143	Btk	B lymphoid kinase

FIGURE 7-3

Cluster	Access	Locus	Gene	Description
8	NM_013736	27224	Tceb3	transcription elongation factor B (SII), polypeptide 3
8	NM_026329	67710	Poi2g	polymerase (RNA) II (DNA directed) polypeptide G
8	AK021279	18573	Pote1a	phosphodiesterase 1A, calmodulin-dependent
8	BC016073	68916		RIKEN cDNA 118005803 gene
8	AK006392	75547		RIKEN cDNA 170026G02 gene
8	NM_019476	28849	Ohr159	olfactory receptor 159
8	AF367244	230233	Itihap	inhibitor of kappa light polypeptide enhancer in B-cells, kinase complex-associated protein
8	AK008108	72043	Sulf2	sulfatase 2
8	AK017309	71302	Pex1	peroxisome biogenesis factor 1
8	NM_016881	54132	Pdim1	PDZ and LIM domain 1 (elfin)
8	AF156480	14405	Gabrg1	gamma-aminobutyric acid (GABA-A) receptor, subunit gamma 1
8	NM_013568	16950	Lox3	lysyl oxidase-related protein 2 b2 b2
8	NM_008015	14209	Fin14	fibroblast growth factor inducible 14
8	NM_019678	18798	Pfcd	phosphodiesterase C, delta
8	AK014840	70821		RIKEN cDNA 4321507P07 gene
8	NM_019583	50605	Il17br	interleukin 17B receptor
8	NM_013592	17183	Mafn4	mafKlin 4
8	AK017529	52447		DNA segment, Chr 6, ERATO D01 633, expressed
8	AK005105	68980		Similar to WD domain, C-beta repeat-containing protein [Homo sapiens] 83 %
8	AK007657	69151		solute carrier family 35 member s1c35a2 udp galactose translocator; mug1 udp-galactose transporter
9	NM_078484	22232	Slc35a2	Similar to Protein Transport protein Sec24D (SEC24-related protein D)82% Human
9	AK0009425	69608		polycythemia rubra vera 1; cell surface receptor; cell surface receptor [Homo sapiens] 49 %
9	AK004472	68891		spinocerebellar ataxia 2 homolog (human)
9	NM_009125	20239	Scp2	11-zinc-finger transcription factor c1c multivalent dna-binding utilizing different zinc fingers to recognize diverged dna sequences in promo
9	NM_007794	12018	Clef	RIKEN cDNA 493033A06 gene
9	AK015893	75156		Similar to - HIV TAT specific factor 1; cofactor required for Tat activation of HIV-1 transcription [74% Homo sapiens]
9	AK014404	74014		acid phosphatase, prostate
9	AK011234	72459	Acpq	RIKEN cDNA 2310016G11 gene
9	NM_019807	56318		THIO_HUMAN Thioredoxin (ATL-derived factor) (ADF) (Surface associated sulphhydryl protein) (SASP) 52 %
9	AK009387	69578		zinc finger protein 120
9	NM_026132	67402		BRF2, subunit of RNA polymerase III transcription initiation factor, BRF1-like
9	NM_023266	66653	Bzf2	trehalase (brush-border membrane glycoprotein)
9	AK017767	58868	Treh	chromosome 20 open reading frame 10 (55% human)
9	NM_021481	22169	Ty4i	9030607L17Rik RIKEN cDNA 9030607L17 gene
9	L32973	71564		similar to A49307 98K GTPase-activating protein ABR, brain - human 29 %
10	AK007294	71564		chemokine (C motif) receptor 1
10	AK018541	23765	Agp2	sp:P46096 - SYT1_MOUSE Synaptotagmin 1 (SY1) (p65) 38 %
10	NM_011783	71709		RIKEN full-length enriched library, clone:54304054-02
10	AK004654	23832	Xcr1	ald synthase h+ transporting mitochondrial f1f0 complex subunit e atp5c; f1f0-atpase
10	NM_011768	56279		RIKEN cDNA 1110068E08 gene
10	NM_018833	77314		butyrylcholinesterase, member A1
10	AK021056	14232	Fkbp8	ATPase, Ca++ transporting, cardiac muscle, fast twitch 1
10	NM_010223			- A55180 transitional endoplasmic reticulum ATPase (EC 3.6.1.-) [validated] - rat 35 %
10	AK017271			DnaJ (Hsp40) homolog, subfamily B, member 7
10	NM_007507	11958	Atp5k	upregulated in colorectal cancer gene 1
10	NM_018435	104130	Np15	RIKEN cDNA 2010001E11 gene
10	NM_013483	12231	Bn1a1	pleckstrin and Sec7 domain protein [56% Homo sapiens]
10	AK010471	68878		RIKEN cDNA 2310079N02 gene
10	NM_007504	11937	Alp2a1	13 days embryo head riken cDNA clone:3110031b13
10	NM_028487	67979		ras homolog gene family, member H
10	AK006201	57755	Dnalb7	low density lipoprotein receptor-related protein 1
10	AF033350	18951	Sep-05	rat guanine nucleotide dissociation stimulator
10	NM_053182	94228	Ucc1	caudal type homeo box cdx4
11	AK008003	72045		insulin degrading enzyme
11	AK016466	70965		
11	NM_025568	68568		
11	NM_0256075	67288		
11	AK017885	74734	Anh	
11	NM_008512	16971	Lrp1	
11	NM_009056	18730	Ralgs	
11	NM_007874	12592	Cdx4	
11	NM_031156	15925	Ide	

FIGURE 7-4

Cluster	Access	Locus	Gene	Description
11	AK014861	70894		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:492151QJ17 product:hypothetical EF-hand containing protein
11	NM_011638	22042	Ttr	transferrin receptor
11	NM_008751	12057	Bfsp1	beaded filament structural protein in lens-CP94
11	AK009778	69671		RIKEN cDNA 231004308 gene
11	NM_016878	53356	Etf3s4	eukaryotic translation initiation factor 3, subunit 4 (delta)
11	NM_007668	12568	Cdk5	cyclin-dependent kinase 5
11	NM_020570	57434	Xcc2	X-ray repair complementing defective repair in Chinese hamster cells 2
11	AF163606	20658	Sn	Sn cell proliferation protein
11	NM_013933	30660	Vspa	vesicle-associated membrane protein, associated protein A
11	NM_010181	14118	Fnc2	fibritin 2
11	NM_030258	80290		hypothetical protein, MGC:7035; hypothetical protein MGC7035 [Mus musculus] 100 %
11	NM_009639	11572	Arg2	acidic epidermal glycoprotein 2
11	AK012224	76795		vesicular Rab-GAP/TBC-containing: BUB2-like protein 1 [Mus musculus] 48.54 %
11	NM_008702	18099	Nfk	nemo-like kinase nfk related to erk/map kinases localized nucleus
11	NM_009644	17830	Muc10	mucin 10, submandibular gland salivary mucin
11	AK002441	66039		hypothetical protein FLJ13263(71% human)
11	NM_021364	23845	Clec5s	C-type (calcium dependent, carbohydrate-recognition domain) lectin, superfamily member 5
12	BC010206	66734		microtubule-associated protein 1 light chain 3 alpha; MAP1 light chain 3-like protein 1; microtubule-associated proteins 1A/1B light chain 3 [Homo sapiens]
12	AK005884	76382		RIKEN cDNA 1700012A03 gene
12	NM_016910	53892	Ppm1d	protein phosphatase 1D magnesium-dependent, delta isoform
12	AK002826	67675		divalent cation tolerant protein CUTA [Homo sapiens] 91 %
12	NM_007895	14133	Fcna	ficollin A
12	NM_010877	17970	Ncd	neutrophil cytosolic factor 2
12	NM_011991	26572	Cops3	COP9 (consistutive photomorphogenic) homolog, subunit 3 (Arabidopsis thaliana)
12	AK006440	75564		RIKEN cDNA 1700027N10 gene
12	NM_021489	58992	F12	coagulation factor XII (Hageman factor)
12	AK007819	69822		RIKEN cDNA 1810047P18 gene
12	M26158	14990	H2-M2	histocompatibility 2, M region locus 2
12	AK017134	74470		RIKEN cDNA 483440J22 gene
12	NM_009141	20311	Cxcl5	chemokine (C-X-C motif) ligand 5
12	NM_010282	14593	Cgpi1	geranylgeranyl diphosphate synthase 1
12	NM_025821	52502		DNA segment, Chr 18, ERATO Dcl 465, expressed
12	AK015243	252876		hypothetical protein FLJ20125 [83% Homo sapiens]
12	BC006905	75608		HSPC134 protein [60% Homo sapiens]
12	NM_028082	74742		RIKEN cDNA 5830411J07 gene
12	NM_031870	55993	Msh4	mutS homolog 4 (e.coli)
12	NM_008875	17865	Nbl1	neuroblastoma, suppression of tumorigenicity 1
12	AK017174			Mus musculus 11 days pregnant adult female ovary and uterus cDNA, RIKEN full-length enriched library, clone:5033415K03 product:weakly similar to PUTATIVE BREAST EPITHELIAL STROMAL INTERACTIC
12	AK008060	72058		RIKEN cDNA 2010030J20 gene
12	NM_026495	67991		RIKEN cDNA 0610020J02 gene
12	AK019578	78924		retNP_038605.1 -L1 repeat, T1 subfamily, member 30 [Mus musculus] 77.97 %
12	NM_010497	15928	Icd1	isocitrate dehydrogenase 1 (NADP+), soluble
12	NM_009860	12532	Cdc25c	cell division cycle 25 homolog c t. Cerevisiae
12	U82439	19276	Ptgm2	protein tyrosine phosphatase ts-2beta ptp an autotantigen in insulin-dependent diabetes mellitus; phosphatase-tyr ptp-tyr receptor

Figure 7- 5

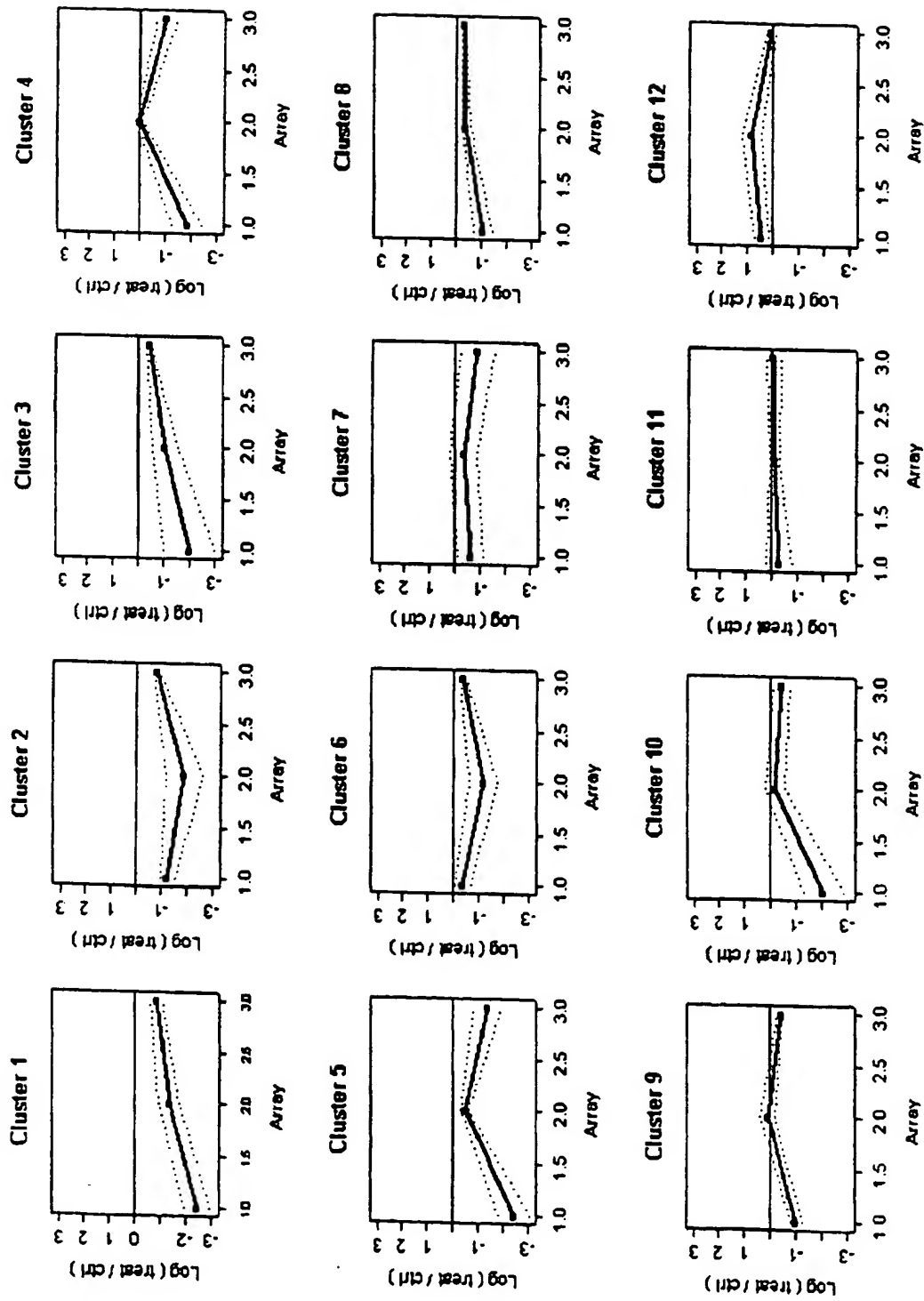


FIGURE 8-1

Cluster	Accession	Gene	Description
1	NM_008918	Pro1	pancreatic polypeptide
1	NM_008938	Pro1	paired like homeodomain factor 1
1	AK018214		
1	NM_010783	Gabr2	gamma-aminobutyric acid gamma-receptor subunit rho 2 gabr2
1	NM_008076		RIKEN cDNA 170084J12 gene
1	AK006993	Teaf1	TPA regulated factor
1	NM_011626	Snai1	neural stem cell derived neuronal survival protein
1	BC003986	Prn22	peripheral myelin protein 22 kDa prn22
1	NM_008885	Defb4	defensin beta 4
1	NM_019728		RIKEN cDNA 4930470P17 [Mus musculus]
1	NM_028287		adult male testis riken cDNA clone:4930570K09
1	NM_025423	Sema3	sema domain, immunoglobulin domain (lg), short basic domain, secreted, (semaphorin) 3C
1	NM_013857		RIKEN cDNA 2510027N19 [Mus musculus]
1	AK017809		ref:NP_116187.1 - hypothetical protein FLJ14503 [Homo sapiens] 71.78 %
1	NM_026330	V2f4	vonteronasal 2, receptor, 4
1	AK018929		endothelin-b receptor ednrb
1	NM_009493	Ednrb	lbr2 l-box-containing
1	NM_018779	Eomes	Similar to PLT_HUMAN Protein PLT 81 %
1	NM_007904		expressed in non-metastatic cells 2, protein
1	AB031037		myosin Vo
1	AK014438		HSPC182 protein [98% Homo sapiens]
1	NM_013562	Cerb	carbonic anhydrase B
1	NM_018716	Ep4.13	erythrocyte protein band 4.1-like 3
1	NM_008705	Ccrl	cyclin L1
1	AK011950	Sulx1	sulfotransferase-related protein SULX1
1	AK021254		chromosome 20 open reading frame 107; similar to neuronal thread protein [Homo sapiens] 80 %
1	NM_011615	Erva	endogenous retroviral sequence 4 (with leucine t-RNA primer)
1	NM_010864	Podra4	protodesherin alpha 4
1	NM_012065	Opn1mw	opsin 1 (cone pigments), medium-wave-sensitive (color blindness, deutan)
1	NM_008492		hypothetical protein FLJ13852 [Homo sapiens] 78 %
1	AK018168		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:48334.27G17 product: hypothetical protein
1	NM_009802	Ccapn8	RIKEN cDNA 7420700M05 gene
1	NM_013813	Capn8	calpain capn8
1	NM_019937	Men1	HeLa cyclin-dependent kinase 2 interacting protein (77% human)
1	NM_019937	Gcnt2	merlin men1
1	NM_020564	Nfm	glucosaminyltransferase, l-branching enzyme
1	AK006503	Gna13	neurofilament medium polypeptide nfm
1	Y12713	Artn	guanine nucleotide binding protein alpha 13 gna13
1	NM_007768	Atp5b1	adenin
1	NM_008106	Phox	atp synthase h+ transporting mitochondrial f1 complex alpha subunit isoform atp5b1
2	AK018985		phosphorylated edictor for mra export phox
2	NM_007708	Atp10a	142372 probable guanylate kinase (EC 2.7.4.8) 1, membrane-associated, splice form b - mouse 44 %
2	NM_026333		ATPase, class V, type 10A
2	AK002612		
2	BC018324		
2	BC004027		
2	AK018951		
2	AJ250973		
2	AK018381		
2	NM_007803		
2	AK004355		
2	NM_006563		
2	AB037598		
2	NM_008691		
2	NM_010203		
2	NM_009711		
2	NM_007505		
2	NM_018996		
2	AB045323		
2	AF156549		
2	AK006173		

FIGURE 8-2

Cluster	Accession	Location	Gene	Description
2	AB016802			
2	NM_023200	87155	S46251	SNF2alpha protein - 83%, human
2	BC004653	22784	Sic30a3	solute carrier family 30 zinc transporter member slc30a3; znt-3
2	NM_011773	15509	Kcne1	adult male stomach riken cdna clone.2210415d16; K ⁺ channel
2	NM_008424	22773	Zic3	zic3 protein
2	NM_009575	110157	Rel1	adult male olfactory brain riken cdna clone.843040214; craf protein kinase raf
2	BC015273	56838	Soya28	small inducible cytokine a28 soya28
2	NM_020279	54392	Hespg	chromosome condensation protein G
2	AJ237595			
2	AK015427			
2	AK007097	18224	Pigs1	prostaglandin-endoperoxide synthase 1
2	NM_008969	13405	Dmd	dystrophin mutation results in a mild muscular dystroph
2	NM_007868	15357	Hmgcr	hmg-coa reductase 3 end
2	NM_023865			
2	NM_019464	54673	Sh3glb1	endophilin b1a/alternatively spliced alternatively family member ortholog of b1 sequence
2	AK012967	76553	ENC1_MOUSE	ENC1_MOUSE Ectoderm-neural cortex.1 protein (ENC-1) 80 % /
2	AK006739			
2	NM_011855	23963	Odz1	odd Oz/ten-m homolog 1 (Drosophila)
2	AF282301	258488	MOR224-4	olfactory receptor MOR224-4
3	BC005825			
3	NM_025950	67072	Cdc37l	11 days embryo riken cdna clone.2700033a15
3	NM_011251	19654	Rbm6	RNA binding motif protein 6
3	NM_008562	17210	Mcl1	myeloid cell leukemia sequence 1
3	NM_025838			
3	AK005978			
3	AK018788	18408	Sic25a15	solute carrier family 25 mitochondrial carrier ortholog transporter member 15 slc25a15
3	NM_011017			
3	AK010430			
3	NM_007397	11481	Acvr2b	activin receptor acvr 1b transmembrane ser/thr kinase bcdom
3	AV061808			
3	NM_011603	237338	Tbp11	TATA box binding protein-like 1
3	NM_016819			
3	AK016881			
3	AK013342			
3	NM_020507			
3	NM_019757	30826	Pcdh13	protocadherin 13
3	AK012773	229211	VERY-LONG-CHAIN	VERY-LONG-CHAIN ACYL COA DEHYDROGENASE VLCAD homolog [Homo sapiens]
3	AK020784			
3	NM_026580	68149		ubiquitin-specific protease otubain 2 (94%)
3	AK016557			
3	AK018327			
3	NM_028513	73353	Arpm2	actin related protein M2
3	NM_025736			
3	NM_010450	15396	Hoxa11	homeobox protein hoxa 11
3	AF145716			
3	AF080580	12850	Coq7	demethyl-Q 7
3	AK006388			
3	NM_023567	84047	Cecr6	cat eye syndrome chromosome region, candidate 6 homolog (human)
3	BC005886			
3	NM_008635	17761	Mtp7	microtubule-associated protein 7
3	AK003782			
3	AK016870			
3	NM_016919	16996	Ltbp1	latent tgf beta binding protein ltbp-1
3	NM_021471			
3	AK003784			
3	AK021006			
3	AK007402			
3	BC002598			
3	AK012848			
3	AF217319			

FIGURE 8-3

Cluster	Access	Gene	Description
3	AK015345	Gcc6	glycan 6 gpc6
3	NM_011821		DNA segment, Chr 3, ERATO D01 250, expressed
3	NM_025714		
3	AK015229		
3	AK020927		DNA segment, Chr 11, Wayne State University 89, expressed
3	AK009763		
3	NM_025980		
3	AK004582	H110	T12514 hypothetical protein DKFZp344A073.1 - human 74 %
3	NM_008197	Malg	h1 histone family member clone nrg:6248, h1f0
3	NM_010756	Ube2c	v-maf musculoaponeurotic fibrosarcoma oncogene family protein g avien malg
3	AK003722	Klzf2a	ubiquitin-conjugating enzyme E2C
3	NM_008442		kinasin family member 2A
3	AK008590		Similar to ENP1_HUMAN Ectonucleoside triphosphate diphosphohydrolase 1 (NTPDase1) (Ecto-ATP diphosphohydrolase) 44 %
3	NM_011658	Syngt1	es cells riken cdna clone:2410007m11
3	NM_009303		
3	NM_023153		
3	AK005939	Hao1	hydroxyacid oxidase liver hao1
3	NM_010403	Rgs3	RIKEN cDNA 270004SP11 gene
3	AK012380	Cyzl1	regulator of G-protein signaling 3
3	AK004648		crystallin, zeta (quihone reductase)-like 1
3	AK010433		
3	AK010327	Mlep5	18 days embryo riken cdna clone:1110005n14
3	NM_015776	Sgpp1	sphingosine-1-phosphate phosphatase 1: sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
3	NM_000750	Olog	BCL2-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
3	AK017362		oligotin modin-like extracellular matrix protein mtemp
3	NM_013824		
3	AK012702		
3	NM_007411	Gpaal	gpl anchor attachment protein clone nrg:5680
3	NM_021513		CGI-99 protein [Homo sapiens] 87 %
3	NM_010331	B3gal13	UDP-Gal beta-GalNAc beta 1,3-galactosyltransferase, polypeptide 3
3	NM_026528	Gsr	glutathione reductase gsr
3	AK017726	Srx4	sorting nexin 4 [Mus musculus] 100 %
3	NM_020026	Inmp	intracellular protein
3	NM_010344		
4	AK002768	Pke	PKE protein kinase, hypothetical serine/threonine protein kinase [Mus musculus] 100 %
4	NM_080557	Cg10871	Cg10871 like (Drosophila)
4	NM_008383		
4	AY029533		
4	NM_021302		
4	AK003939		
4	AK006008		
4	NM_011088		
4	NM_028401	Alp242	RIKEN cDNA 1700018M17 gene
4	AK006094	Taf1e	serco/endoplasmic reticulum ca2+ atpase serca2b
4	NM_021468	Fu18	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, A
4	NM_010243		fucoyltransferase 8 fu18
4	AK018744		
4	NM_009783		Jak-binding protein 1
4	AF167573	Kst1	kinase interacting with leukemia-associated statinim bcl2; 10 11 days embryo riken cdna clone:2810464d04
4	AK003611	Kt19	birc-1 transcription factor
4	NM_009528	Pri	perioxin
4	NM_019412	Uml1	Endogenous retrovirus HERV-K10 putative pol polyprotein (33% human)
4	AK013066		undifferentiated embryonic cell transcription factor uel1
4	NM_009482	Coro1c	coronin-3
4	NM_011779	Cy119	methyltransferase Cy119
4	AK006571	Rpl3	r1 protein yeast ribosomal r3 homologue
4	AK011354		
4	NM_013782		

FIGURE 8-4

cluster analysis I
colon cancer
context

Cluster	Accession	Location	Gene	Description
4	NM_031173			
4	AK018968	69178	Stev5	sorting nexin 5
4	NM_024225			
4	AK018227	13393	Dlx3	d1x-7 distal-less homeobox distal-less 3 this sequence comes from table 2: d1x-3
4	NM_010055			
4	NM_018753	76840		RIKEN cDNA 1700113H08 gene
4	AK007185	77734		hypothetical protein FLJ10652 [58% Homo sapiens]
4	AK020121	30839	Fbw5	F-box and WD-40 domain protein 5
4	NM_013908	111173	Rab6p2	rab6-interacting protein isoform b
4	NM_053204	14397	Gabra4	adult male hippocampus riken cDNA clone:2000059a15
4	AK013727	14617	Gja9	gap junction membrane channel protein alpha gja9, connexin 36 cd38
4	NM_010290			
4	AK015845	27418	Abcd5	ATP-binding cassette, sub-family C (CFTR/MRP), member 5
4	NM_013790	56485	Slc2a5	fructose transporter gluf5
4	NM_019741			
4	AK010396	98985		CFP1_HUMAN Pre-mRNA cleavage complex 1 protein Cfp1 (88% human)
4	BC003237	19330	Rab18	ras-related protein rab18
4	NM_011225	77634	Itih7	small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]
4	AK019863	18172	Itih7	itih7, itih7 17 receptor
4	NM_008059	17318	Md1	midline 1
4	NM_010787	74315		palchad related protein (translocated in renal cancer [28.14% Homo sapiens])
4	AK014406			
4	AK012109			
4	NM_008326			
5	NM_024201			
5	NM_007607			
5	AJ401481			
5	NM_028448	58470	Rgs19ip1	riken cDNA 2610042D04 clone nrg: 6350; 2610042D04nrg
5	NM_010716	16882	Lig3	ligase iii dna top-dependent lig3
5	AK005559			
5	NM_030253			
5	NM_008517	16993	Liedh	leukotriene A4 hydrolase
5	AK014178			
5	NM_053071	12884	Cor6c	cytochrome c oxidase, subunit Vtc
5	AK008197			
5	EC005581			
5	NM_008548	17155	Man1a	mannosidase alpha man1a
5	NM_011246			
5	NM_007863			
5	NM_008558	17187	Max	bhlh2z protein myn putative
5	NM_008549	17156	Man2a1	mannosidase 2 alpha man2a1
5	AK014501	70779		PRD5_HUMAN PR-domain Zinc finger protein 5 87 %
5	NM_025591	68488		RIKEN cDNA 2010309E21 gene
5	NM_008047			
5	AK008122			
5	AY032655	80297	SpnB4	spectrin beta 4
5	NM_012032	26943	Tde1	membrane protein tms-1
5	NM_023889			
5	NM_020658	57316	C1d	small unique nuclear receptor co-repressor sun-cor corepressor for hormone receptors c1d; dna-binding protein c1d
5	NM_009539			
5	NM_025295			
5	NM_008920			
6	AK003384			
6	AK005132	72003	Synp	synaptotagmin
5	NM_018715	74287	Pncd	potassium channel modulatory factor
5	NM_011550	21428	Tcf4	transcription factor like 4 tcf4
5	AK010821	76820		RIKEN cDNA 241015M17 gene
5	NM_021353	13487	Slc26a3	down-regulated in adenoma dma
6	D28787	20908	Sbx3	syntactin 3a
5	NM_028312			
5	NM_022408	27888	Es2el	expressed sequence 2 embryonic lethal - Es2 protein; DNA segment, Chr 16, human DZ251289E, expressed [Mus musculus] 100 %

FIGURE 8-5

Accession	Gene	Description
5 AK008213		
5 AK012504		
5 AK009382		NICE-3 protein (Homo sapiens) [82 %]
5 AK014338		
5 AK017508		
5 NM_028785		RIKEN cDNA 1200017A24 gene
5 L47888		
5 NM_009328		
5 NM_020004		Gcn5l2 gcn5 histone acetyltransferase, clone fraga.3491089
5 NM_013541		protein regulator of cytokinesis 1-like
5 AF_009435		hypothetical protein FLJ11198 (90% human)
8 NM_026235		prepromelastatin
8 NM_009215		Srsf1
8 NM_021405		
8 AK019873		
8 AK017855		Myg1 melanocyte proliferating gene 1
8 AK015743		
8 BC003852		
8 AK018155		
8 NM_019703		Ptkp phosphotransferase-1 c isozyme ptkp: elp: d-fructose 6-phosphate 1-phosphotransferase ptk- α ; phosphotransferase platelet ptkp
8 NM_021418		Taf11 TAF11 RNA polymerase II, TATA box binding protein (TBP)-associated factor
8 BC005603		
8 AK012128		
8 AF_009839		adriamycin-resistant related protein arr
8 NM_010060		dynein exon heavy chain 11 dnahc11
8 BC005658		
8 BC004025		
8 BC004010		
8 NM_008018		
8 NM_016754		Myblp es cells riken cDNA clone:2410014f02
8 NM_009613		a disintegrin and metalloprotease domain 11
8 K00083		interferon-gamma (multi-gamma)
8 NM_053186		
8 NM_021338		
8 AK012532		
8 AK016841		
8 AK011882		Similar to G1001 protein [97% Homo sapiens]
8 D64112		
8 AG037869		Calb2 calbindin 2
8 NM_010389		H2-Ob heterocompatibility 2 o region beta locus h2-ob
8 AK016757		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone: 4933409C03 product/hypothetical Heat shock protein hsp70/Ankyrin-repeat/Yeast DNA-binding domain containing 1
8 NM_018782		
8 NM_025301		Mpi117 ribosomal protein mitochondrial 128 rpm128
8 AF_398969		
8 NM_010148		
8 NM_021275		Epm2a epilepsy, progressive myoclonic epilepsy, type 2 gene alpha
8 NM_011315		Kcna4 potassium voltage gated channel shaker related subfamily member 4 kana4
8 AK004206		Saa3 saa3 encoding serum amyloid a exons 3 and 4 aa et 141
8 NM_007733		AD18_HUMAN Protein ADQ18 (Protein CGI-118) (K0009) 80 % /
8 AK005178		adult male testis riken cDNA clone:4931428b13 full insert sequence; collagen a1 xlc chain
8 NM_010155		RIKEN cDNA 1500008C08 gene
8 AK005818		esd2 repressor factor erf
8 NM_008878		
7 NM_018952		Ncaa2 glucocorticoid receptor interacting protein grip1 hormone-dependent interaction with hormone binding domains of steroid receptors transactivator nuclear coactivator ncaa-2
7 NM_018912		Brl3 B-cell stimulating factor
7 NM_009885		Cdk2 cyclin-dependent kinase-like 2 (CDC2-related kinase)
7 NM_026077		Cel carboxyl ester lipase
7 AK011747		RIKEN cDNA 3110040N11 [Mus musculus]
7 NM_026578		
7 NM_018819		Nola1 nucleolar protein family A, member 1 (NACA small nucleolar RNPp)
7 NM_016666		

FIGURE 8-6

cluster analysis of
colon cancer
cortex

Cluster	Accession	Label	Gene	Description
7	NM_007651	14825	Gro1	gro1 oncogene
7	NM_008176	11600	Angptl	angiotensin
7	NM_008640	11600	Angptl	angiotensin
7	NM_008081	14422	Galg12	UDP-N-acetyl-alpha-D-glucosamine-6-phosphate-4-epimerase
7	NM_053265	114673	RIKEN cDNA 483043N12	gene [Mus musculus]
7	NM_030004	68631	Cry1l	crystallin, lambda 1
7	NM_021565	59090	Mdn	midline
7	NM_011801	17527	Mpv17	mpv17
7	NM_008622	76920	RIKEN cDNA 493052B08	clone mpc:7635
7	AK019713	67392	RIKEN cDNA 4830420G17	gene
7	AK014735	18824	Plb2	proteolipid protein 2 [Mus musculus] 100 %
7	NM_025383	70573	Plb2	proteolipid protein 2 [Mus musculus] 100 %
7	NM_019755	70573	Plb2	proteolipid protein 2 [Mus musculus] 100 %
7	AK017705	67509	Dgal2	hypothetical protein FLJ10560 [82.88-Homo sapiens]
7	AK015650	67509	Dgal2	hypothetical protein FLJ10560 [82.88-Homo sapiens]
7	NM_026384	67800	Dgal2	adult male kidney riken clone:0610010b08
7	AK020305	77704	Dgal2	sp.P11590 - MUP4, MUSE Major urinary protein 4 precursor (MUP 4) 39 %
7	AF320615	51789	Tnk2	Mus musculus Tnf receptor-associated factor 3 (Traf3) gene, partial sequence and annotation precursor protein (Amm) gene
7	AK003744	51789	Tnk2	tyrosine kinase, non-receptor, 2
7	NM_016788	11429	Aco2	mitochondrial acetylase nuclear aco2 clone mpc:7148
7	NM_080633	76497	Ppp1r11	protein phosphatase 1, regulatory (inhibitor) subunit 11
7	NM_025620	51788	H2alz	histone H2a.z
7	AK005379	56213	Prs11	profesase, serine, 11 (gf binding)
7	NM_018750	68258	Mpra17	adult male tongue riken clone:2310032709
7	NM_018564	68258	Mpra17	adult male tongue riken clone:2310032709
7	NM_025450	68258	Mpra17	adult male tongue riken clone:2310032709
7	NM_027044	12518	Ips	b cell mb-1
7	AK017242	26557	Hoc22	home-2b enh1/mb1 domain protein carboxy-terminal coiled-coil domain selectively binds group metabotropic receptors and links ip3 receptors. 11: cupidin multi modular in synapses undergoing a
7	NM_007855	15902	Hoc22	home-2b enh1/mb1 domain protein carboxy-terminal coiled-coil domain selectively binds group metabotropic receptors and links ip3 receptors. 11: cupidin multi modular in synapses undergoing a
7	AF093260	24105	Uboc7lp3	ubiquitin conjugating enzyme interacting protein 3 uboc7lp3
7	NM_019705	16780	Anrep	alanyl membrane aminopeptidase n m microsome cd13 p150 clone mpc:5920: leucine aminopeptidase intestinal lap1
7	AK003542	68730	Cyp1a10	adult male kidney riken clone:0610011d16: cyp1a10 cytochrome p-450
7	NM_008486	13117	Cyp1a10	adult male kidney riken clone:0610011d16: cyp1a10 cytochrome p-450
7	AK004041	67875	Cyp1a10	adult male kidney riken clone:0610011d16: cyp1a10 cytochrome p-450
7	AB018421	78408	KIAA0773	divalent cation tolerant protein CUTA [Homo sapiens] 91 %
7	AK002828	76454	KIAA0773	divalent cation tolerant protein CUTA [Homo sapiens] 91 %
7	BC003957	76454	KIAA0773	divalent cation tolerant protein CUTA [Homo sapiens] 91 %
7	AB041588	15416	Horz8	hormo box B8
7	NM_023878	17344	Miz1	Max-interacting zinc finger
7	NM_008602	69184	Derr	density-regulated protein
7	NM_026503	69184	Derr	density-regulated protein
7	AF197159	59038	Cubn	cubilin (intrinsic factor-cobalamin receptor)
7	NM_021534	59038	Cubn	cubilin (intrinsic factor-cobalamin receptor)
7	NM_008821	18630	Pxmp4	peroxisomal membrane protein 4
7	NM_013727	27215	Pxmp4	peroxisomal membrane protein 4
7	AK006243	66091	Ar2	5-azacytidine induced gene 2
7	AF109908	66091	Ndufa3	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3
7	AK004388	68885	Ar2	5-azacytidine induced gene 2
7	NM_020271	57078	Ar2	5-azacytidine induced gene 2
7	AK012338	72611	Gaa	likely ortholog of yeast ARV1 [Homo sapiens] 80 %
7	NM_008064	14387	Gaa	hypothetical protein, MNCB-4183
7	AK006819	14387	Gaa	Similar to finger protein pALZ-4 - mouse 45%
7	AK014242	68581	Trmp21	transmembrane trafficking protein
7	AK003878	21857	Trmp21	transmembrane trafficking protein
7	NM_011593	11838	Arc	growth factor arc
7	NM_018760	12564	Cdh8	cadherin-8
7	NM_007687	13929	X83328	EST X83328
7	NM_025275	71687	X83328	EST X83328
7	AK002841	71687	X83328	EST X83328

FIGURE 8-7

Cluster	Accession	Gene	Description
72205	7 AK005562		Similar to EML2_HUMAN Echinoderm microtubule-associated protein-like 2 (EMAP-2) (HUEMAP-2) human82 %
	7 NM_009745		
	7 NM_023850		
	7 NM_007430		
	7 BC003427	NOD1	nuclear receptor subfamily 0, group B, member 1
	7 NM_031369	RnA2	ribonuclease/angiogenesis inhibitor 2
	7 AK006012	Chil1	chitinase 1 (chitinotrioxidase)
	7 AK003498		T08875 hypothetical protein DKFZp564F0522.1 - human (fragment) 49 %
	7 NM_019781	Pex14	peroxisomal biogenesis factor 14 - PEZE_MOUSE Peroxisomal membrane protein PEX14 (Peroxisomal membrane anchor protein PEX1 100 %
	7 AJ253897		
	7 NM_008343	Igf1bp3	insulin-like growth factor binding protein-3
	7 AK014638		
	7 NM_018871	Ywhag	3-monooxygenase/hydrophobic 5-monooxygenase activation protein, gamma polypeptide
	7 AK007859		RIKEN cDNA 181003OM08 gene
	7 AK009587		RIKEN cDNA 231003C13 gene
	7 AK007567	Oxal1	oxidase assembly 1-like
	7 AK017455	Obp1a	odorant binding protein 1a
	7 AK016678		RIKEN cDNA 4933425F06 gene
	7 NM_009394	Tnc3	tropontin c fast skeletal
	7 NM_008324	Indo	indoleamine-pyrole 2,3 dioxygenase
	8 AK017289		
	8 NM_010164		
	8 AK008023		
	8 AK017076		
	8 AK010554	Gngt2	guanine nucleotide binding protein (G protein), gamma transducing activity polypeptide 2
	8 NM_019503	Fxyd1	FXYD domain-containing ion transport regulator 1
	8 NM_009782	Pax5	paired box 5 gene 5
	8 NM_023220		putative transmembrane cleaving protease [81% Homo sapiens]
	8 NM_009148	Sdfr2	stromal cell derived factor receptor 2
	8 NM_033601	Bcl3	B-cell leukemia/lymphoma 3 [Mus musculus] 100 %
	8 NM_008849	Pit1	pit-1
	8 AK005619		
	8 NM_009289	Src	neuronal proto-oncogene c-src encoding tyrosine-specific protein kinase
	8 NM_009271		
	8 AK014082		
	8 AK005253		
	8 AK014892	Alrp	autocrine/infinity-related protein alrp malp; adult male testis riken cdna clone 4821514h13
	8 NM_010440	Hmg20b	high mobility group 20 B
	8 NM_013915		
	8 AK014460		
	8 NM_008535	Lyl1	lymphoblastic leukemia
	8 NM_018813	Txn2	thioredoxin 2
	8 AK016245		RIKEN cDNA 49304280 20 gene
	8 AY014697		SPT3-associated factor 42 [85% Homo sapiens]
	8 BC002307		
	8 NM_025982		
	8 NM_022020	Gp1bb	glycoprotein Ib, beta polypeptide
	8 NM_010027		
	8 NM_018768	Hccs	Holocytochrome c synthetase
	8 NM_008180	Gpr27	G protein-coupled receptor 27
	8 NM_008158		
	8 AK015369		
	9 AK005560		
	9 NM_009177	Staf4a	staf4-related 4A (beta-galactosidase alpha-2,3-dialyltransferase)
	9 BC006782		T50839 U4/U6 small nuclear ribonucleoprotein HPrp3 [imported] (89% human)
	9 NM_017487	Zfp316	zinc finger protein 316; kruppel-related zinc finger protein [Mus musculus] 100 %
	9 AK019561		RIKEN cDNA 4930423F13 gene
	9 NM_010275		
	9 NM_018436		
	9 AK010908	Prok4	pleckstrin homology, Sec7 and coiled/coiled domains 4
	9 NM_021099	Klt	kit oncogene

FIGURE 8-3

cluster analysis /
colon cancer
cortex

Cluster	Accession	Accession	Gene	Description
9 AK008879	76579		RIKEN cDNA 231008N01 gene	
9 NM_028218	72381		2119399A elongin B [Homo sapiens]	72 %
9 NM_008038	17768		methylenetetrahydrofolate dehydrogenase, nadp-dependent methylenetetrahydrofolate cyclohydrolase mthfd2	
9 NM_028688	76383		H2AM_HUMAN Histone H2A.m (H2A.m)	39 %
9 NM_008108	14562		Gd3	growth differentiation factor 3
9 AF317202	170742		RBT1	replication protein-binding trans-activator
9 NM_008489	16873		Lbx5	lim homeobox protein 5 lhx5
9 X15643	11555		Adrb2	adrenergic receptor, beta 2
9 NM_010294	14826		Gk-r2	glucokinase activity, related sequence 2
9 NM_008238	15218		Foxm1	forkhead box m1
9 BC004617	106795			transcription factor 19 (SC1); transcription factor like [Homo sapiens]
9 AK015519				78 %
9 AK009217	69511		KLK_K_HUMAN Kallikrein 12 precursor (Kallikrein-like protein 5) (KLK-L5)	70 %
9 NM_028207	18208		Nin1	netrin 1
9 NM_008744	72169		Trim29	10 11 days embryo riken cDNA clone.2810431n19; clone image:3488575
9 BC006699	71014		CMG2_HUMAN Capillary morphogenesis protein-2 precursor (CMG-2)	85
9 BC003908	70923		RIKEN cDNA 4921513D11 gene	
9 AK014877				
9 AK004884				
9 NM_017379	53957		Tuba8	tubulin alpha 8 tuba8
9 AK019388	77134			Mus musculus 12 days embryo head cDNA, RIKEN full-length enriched library, clone:3010025E17 product:HETEROGENEOUS NUCLEAR RIBONUCLEOPROTEIN A0 (HNRRNP A0) homolog [Harr
9 NM_019430				
9 AK005628				
9 NM_008095	14467		Gbas	glioblastoma amplified sequence
9 AK006551	67878			hypothetical protein FLJ13448 [Homo sapiens] 84 %
9 NM_009286	20865		Sh2	sulfotransferase, hydroxysteroid preferring 2
9 NM_009287	20866		Slm1	stromal interaction molecule slm1
9 NM_008656	17877		Myf5	myogenic factor 5
9 AF420279				
9 AK004849				
9 AK017294				
9 AK020408	213054		Gabpb2	GA repeat binding protein, beta 2, p1rAS3950 - AS3950 transcription factor GABP beta 2-1 chain - mouse 100.00 %
9 NM_016665	20892		Shr13	stimulated by retinoic acid 13
9 U92885	13638		EfnA3	ephrin A3
9 NM_009694				
9 NM_018719	50915		Grb14	growth factor receptor bound protein 14
9 D26987				
9 NM_011113	18793		Plaur	urokinase plasminogen activator receptor
9 NM_016868	53417		Hic3a	hypoxia inducible factor 3, alpha subunit
9 AK017801	68021			AS6716 aromatic ester hydrolase (EC 3.1.1.-) - human 85 %
9 NM_028635	68774		M4a6d	membrane-spanning 4-domains, subfamily A, member 6D, MISA6D protein [Mus musculus] 100 %
9 BC004701	236930		Tmod4	tropomodulin 4
9 NM_018712	50874			RIKEN cDNA 231007H09 gene
9 AK009207	76429			RIKEN cDNA 4B31431F19 gene
9 AK016497	70980			cDNA sequence BC005752
9 BC005752	233189			SKI-like
9 NM_011386	20482		Skh	fibroblast growth factor 17
9 NM_008004	14171		Fgll17	melanocortin 1 receptor
9 NM_008559	17189		Mclr	RIKEN cDNA 4931428F04 gene
9 AK016481	74356			alpha1 collagen chain
9 NM_007729	12814		Col1a1	sprouty homolog 4 (Drosophila)
9 NM_011898	24066		Spry4	nuclear transport factor 2 - NTF2, HUMAN Nuclear transport factor 2 (NTF-2) (Piscental protein 15) (PP15) 100 %
9 NM_028532	68051		Nuff2	fragile X mental retardation gene 2, autosomal homolog
9 NM_011814	23879		Fxr2h	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, C
9 NM_021441	21341		Tafic	S28281 centromere protein E - 23% human
9 AK006105	70054			hypothetical protein FLJ22378 (81% human)
10 AK018759	68943			hypothetical protein DkrZp434A17 (31% human)
10 NM_026248	67575			similar to uroplakin 1B; telraspan [Homo sapiens] 91 %
10 AK011742	69936			RIKEN cDNA 1700013C04 gene
10 AK005970	75502			RIKEN cDNA 1700123I01 gene
10 AK007250	76663			

FIGURE 8-9

Cluster	Access.	Levens	Gene	Description
10	NM_021388	58168	Ors16	odorant receptor 16
10	AK014868	70918	RIKEN cDNA 492152S17 gene	
10	AF052942	13143	DapK2	death-associated kinase-2
10	BC005454	11428	Aco1	iron-responsive element-binding protein clone mgc-8247; iron responsive element binding
10	AK009778	89871	RIKEN cDNA 2310043I08 gene	
10	NM_010004	13089	Cyp26a0	Cytochrome P450, family 2, subfamily c, polypeptide 40
10	AK020384	77284	Zfp142	zinc finger protein 142
10	NM_009851	11843	Akap4	A kinase (PRKA) anchor protein 4
10	AK018108	69378	YDB4_HUMAN	zona pellucida binding protein [Mus musculus] 34 %
10	AK020194	73999	RIKEN cDNA 803042J24 gene	YDB4_HUMAN Hypothetical protein KIAA1384 88 %
10	AF117340	26401	Map3k1	mitogen activated protein kinase kinase kinase 1
10	NM_009380	21834	Thrb	thyroid hormone receptor beta (trb); subunit
10	AK044687	54437	Dmrt3l	DNA (cytosine-5)-methyltransferase 3-like
10	AK013856	23038	Msp2k5	mitogen activated protein kinase kinase 5
10	AK017105	71213	Dlo1	adult male kidney riken cdna clone:0810011120; deobolase iodotyrosine type 1 dlo1
10	NM_007860	13370	Mcp17	chromosome 11 open reading frame 17 [70% Homo sapiens]
10	NM_020616	17230	Mcp17	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933438A12 product:unclassified
10	NM_014193	57373	Cacna1s	calcium channel, voltage-dependent, L type, alpha 1S subunit
10	AF282291	12292	MOR171-b	opioid receptor MOR171-b
10	AK023184	258811	Klf15	Kruppel-like factor 15 [Mus musculus] 100 %
10	M36599	66277	Rho	rhodopsin
10	NM_021543	212541	Pcdh8	protocadherin 8 [Mus musculus] 100 %
10	NM_017393	53895	Ctip	caseinolytic protease, ATP-dependent, proteolytic subunit homolog (E. coli)
10	NM_027334	70152	DKF-ZP586A0522 protein	[Homo sapiens] 83 % / 168 aa
10	AK003900	72061	Cmah	cytidine monophosphate-N-acetylneuraminic acid hydroxylase
10	NM_008397	12763	Dia1	diaphorase 1 (NADH)
10	NM_007717	67441	Ii20	interleukin 20 i20
10	NM_026158	109754	Ncl4	neutrophil cytosolic factor 4
10	AF332059	58181	Il1rap	Interleukin 1 receptor accessory protein
10	NM_021380	58181	Olf41	olfactory receptor 41 (olf41)
10	NM_008677	17972	Dnase1	deoxyribonuclease 1
10	BC005602	16180	RIKEN cDNA 4930449E07 gene	hypothetical protein FLJ20688 [Homo sapiens] 83.50 %
10	NM_008384	18340	Ppp2r3a	protein phosphatase 2 (formerly 2A), regulatory subunit B, alpha
10	NM_010983	18340	Sirt1	sirt homolog 1
10	NM_010061	13418	Caf3	colony stimulating factor 3 (granulocyte)
10	AK005032	71778	Fau-ps3	Mus musculus adult male kidney cDNA, RIKEN full-length enriched library, clone:0810012A21 product:hypothetical Eukaryotic thiol (cysteine) proteases active site containing protein,
10	AK015430	74665	Asp2	Finkel-Biskis-Reilly murine sarcoma virus (FBR-MuSV) ubiquitously expressed (for derived), pseudogene 3
10	NM_011161	18054	Asp2	aquaporin 2
10	AK014419	20562	Vav2	vav2 oncogene
10	AF144627	12985	Vav2	RIKEN cDNA 4930406E24 gene
11	NM_009971	12985	Emrin	RIKEN cDNA 3200001D21 gene
11	AK002578	87609	Npy1r	neuropeptide y receptor y1
11	U53591	14112	Dmclh	disrupted meiotic cDNA 1 homolog
11	AK015107	11827	Nup210	RIKEN cDNA 2010004P11 gene
11	NM_009500	73937	Gabrg	nuclear pore membrane glycoprotein 210 pom210
11	AK014278	22325	Tcf7l2	gaba-a receptor theta subunit family member
11	NM_010934	71818	Mscp	transcription factor 7 like 2, T-cell specific, HMG-box
11	NM_026434	13404	Nucn1	CLD2_MOUSE CLAUDIN-2.23 %
11	NM_016815	54563		mitochondrial solid carrier protein
11	NM_018815	57249		non-selective cation channel 1
11	NM_020486	73447		PLT_HUMAN Protein PLT 81 %
11	NM_008333	73447		
11	AK006680	67712		
11	AK019700	18192		
11	NM_010940	67111		
11	BC004572			

FIGURE 8-10

Cluster	Accession	Gene	Description
11	NM_052693		
11	NM_025768	Rud5l	RIKEN cDNA 493439F.11 100% Mus musculus
11	NM_011224		RAD51 homolog (S. cerevisiae)
11	AK012687		pre-mRNA processing factor 31 homolog (yeast) [88% Human]
11	NM_013592	Mein4	melitin 4
11	NM_008217	Hes3	hyaluronan synthase 3 has3
11	NM_025658	Ms4e4d	membrane-spanning 4-domains, subfamily A, member 4D
11	NM_008287	Hsf2	heat shock factor hsf2
11	NM_027810		
11	AK006958		RIKEN cDNA 1700080G18 gene
11	AK010480		RIKEN cDNA 2410013I23 gene
11	AK015001		Similar to potassium voltage-gated channel, subfamily G, member 1; potassium channel KC4 [78% Homo sapiens]
11	NM_053098	Cml2	carml-like 2
11	NM_021398	Ereg1	embryonic epithelial gene 1
11	BC003810	Alp6v1c2	ATPase, H ⁺ transporting, V1 subunit C, isoform 2
11	NM_018780	Sirp5	secreted frizzled-related sequence protein 5
11	NM_009757	Bmp15	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 bmp15
11	AK014760		RIKEN cDNA 4833424K13 gene
11	AK012248	Xpo5	exportin 5
11	AK012400		potassium large conductance calcium-activated channel, subfamily M, beta member 2 [Homo sapiens] 85 %
11	BC005669		expressed sequence R74862
11	M26156	H2-M2	histocompatibility 2, M region locus 2
11	NM_023784	Pw1	RIKEN cDNA 2310016N21 [Mus musculus] 100 %
11	NM_009343		P4D finger protein 1
11	AK012908		RIKEN cDNA 2810048L04 gene
11	AK014404	Opr4	RIKEN cDNA 3732407C23 gene
11	NM_013887		opsin 4 (melanopsin)
11	NM_021421		DNA segment, Chr 1, ERATO D01 396, expressed - RIKEN cDNA 2810307I21; hypothetical protein, MNCb-4273 [Mus musculus] 100 %
11	NM_013714	Irab1	interferon response element binding factor 1
11	AK007777		CGI-74 protein; CGL59 protein [Homo sapiens] 88 %
11	AF318301		RIKEN cDNA 3100002P13 gene
11	AK019409	Krt1-5	type I keratin intr a-1
11	X63506	Dpagl2	dephyl-phosphate alpha-n-acetylglucosaminophosphotransferase 2 dpagl2
11	NM_007875	Pnrlp1	phorbol-12-myristate-13-acetate-induced protein 1; Ncoa protein [Mus musculus] 100 %
11	NM_021451		RIKEN cDNA C330006D17 gene
11	AK021182		RIKEN cDNA 1500028D16 [Mus musculus]
11	NM_026616		clone or 1-72m13 olfactory receptor orthologous to or1-72
11	NM_020500	Dbt	dihydrolipoamide branched chain transacylase e2 dbt
11	NM_010022		16 days embryo lung riken cdna clone:8430413n20
11	AK018408		e2f transcription factor 5 clone mgc-6043; e2f-5 protein
11	AK007269	E2f5	glycine receptor, beta subunit
11	NM_007892	Gltb	lysophospholipase 1
11	NM_010288	Lyp1a1	heal-responsive protein 12
11	NM_008868	Hsp12	similar to sp:P11389 - POL2_MOUSE Retrovirus-related POL polypeptide [Contains: Reverse transcriptase; Endonuclease] 43.28 %
11	NM_008287		
11	NM_009252		
11	AK020464		protein tyrosine phosphatase, receptor type, D
11	NM_008782	Ptpro	MYH3_RAT Myosin heavy chain, fast skeletal muscle, embryonic (22% M.musculus)
11	NM_011216		KIAA0268 hypothetical protein (human)-ribosomal protein L27a-suppression of tumorigenicity 5
11	AK006668		origin recognition complex protein homolog marc2f onc2p yeast of replication subunit swiss-prot accos
11	NM_007875	Orc2	
11	AK018937		potassium large conductance calcium-activated channel, subfamily M, alpha member 1
11	NM_010810	Kcnma1	flavin containing monooxygenase fmo3
11	NM_008030	Fmo3	retinoblastoma inhibiting gene 1
11	NM_011248	Rbg1	RIKEN cDNA 9530004P13 gene
12	AK020544		Braf transforming gene
12	M64429	Braf	RIKEN cDNA 4833400B08 gene
12	AK005865		cd53 antigen
12	NM_007651	Cd53	

FIGURE 8-11

Accession	Locus	Description
12 NM_008952	PigR	prostaglandin O receptor
12 NM_008943	ClaA	cytotoxic T-lymphocyte-associated protein 4
12 NM_010946	Nian1	n-terminal asparagine amidohydrolase ntant1
12 NM_020515	Ora16	gene for odorant receptor A16
12 D25047	piga	phosphatidylinositol glycan, class A
12 AK011568		RIKEN cDNA 2610027F03 gene
12 NM_011165	Ptpe	protactin-like protein A
12 AK020853		adult male urinary bladder riken cdna clone:9530081K03
12 AK014599		Similar to sperm adhesion molecule 1 (PH-20 hyaluronidase, zona pellucida binding) [Homo sapiens]
12 AK007235		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700122C07 product:serine/threonine kinase 33,
12 AK014783	Inak3	Interleukin-1 receptor-associated kinase M (73% human)
12 AF360358	ORF9	open reading frame 9
12 NM_009432	Tahb	thyroid stimulating hormone beta-subunit lsh-beta
12 NM_008536	Tmsr11	transmembrane 4 superfamily member 1
12 AK014391		phospholamban [Mus musculus] 100 %
12 LJM_023129	Pin	secretin
12 NM_011328	Scl	plectin 1, intermediate filament binding protein, 500KD [Homo sapiens] 25.74 %
12 AK015166		B59254 myosin heavy chain 12, splice form2 - human 29 %
12 AK015780	Ecl2	ect2 oncogene
12 NM_007900	Jpnk3	juncophilin 3; juncophilin type 3 [Mus musculus] 100 %
12 NM_020605		chondroitin 4-sulfotransferase [Mus musculus] 47 %
12 AK004401		
12 AK016572		
12 AK012399	Crtinap4	contactin associated protein 4
12 AF333770	Clec16	C-type (calcium dependent, carbohydrate recognition domain) lectin, superfamily member 8
12 NM_011989		Mus musculus mRNA for CN B scfV, complete cds
12 AB036341	Ibs	kloronate sulfatase lbs
12 NM_010498		Mus musculus 0 day neonate skin cDNA, RIKEN full-length enriched library, clone:4632413E21 product:weakly similar to PHOSPHOLIPASE B [Rattus norvegicus]
12 AK019474		
12 NM_009796	Capt7	calpain 7
12 AK006511		
12 AF264049		
12 NM_021453		
12 NM_023045	Pepf	18 days embryo riken cdna clone:1110035e17; peptidogen pepf aspartic proteinase
12 BC018550	Ranbp16	ran binding protein 18
12 AK006187		
12 MG5237		
12 AK017277		
12 BC004678	Hsp25	expressed sequence AW123240
12 AK010429		Z147_MOUSE Zinc finger protein 147 (Estrogen responsive finger protein) (Eip) 32 %
12 AK018489	Leg3	day neonate skin riken cdna clone:463241509
12 NM_009478		lymphocyte-activation gene 3
12 AK012378		
12 NM_025380		
12 AK0023826	Traf2p2	RIKEN cDNA 1110018L22 gene
12 NM_009396		tumor necrosis factor, alpha-induced protein 2
12 AK005661		
12 AK004688	Carl1	carbonic anhydrase 1
12 NM_009799	Drelj1	DnaJ (Hsp40) homolog, subfamily A, member 1
12 AK017508	Scnfa	sodium channel, voltage-gated, type IV, alpha polypeptide
12 NM_008298		antigen identified by monoclonal antibody MRC OX-2 receptor (41% Mus musculus)
12 AJ278787		
12 AK014671	Hmrcp	heterogeneous nuclear ribonucleoprotein c hmrpc
12 AK009813	Taf15	TAF15 RNA polymerase II, TATA box binding protein (TBP)-associated factor
12 NM_016884		
12 AK011843		
12 AK014414		
12 AK014613		
12 NM_027719	Wdr17	WD repeat domain 17
12 AK013889	Bspy	B-box and SPRY domain containing
12 AJ276990		

FIGURE 8-12

cluster analysis I
colon cancer
cortex

Cluster	Accession	Gene	Description
12	BC017638		
12	AK014568		RIKEN cDNA 483241224 gene
12	NM_025660		RIKEN cDNA 261002809 [Mus musculus] 100 %
12	AK002512		putative nuclear protein ORF1-FL49 [Homo sapiens] 89.42
12	AK014271		hypothetical protein MGC11257 (82% human)
12	AK015473		KDAA1074 protein [Homo sapiens] 45.33 %
12	AK006800	Usp20	ubiquitin specific protease 20
12	AK009111	Tulip1	tubulin-like protein 1
12	NM_028232		RIKEN cDNA 4933433023 gene
12	AK005860		JC4131 glioma pathogenesis-related protein - human 40 %
12	AF220134		
12	AF220134	Trhr	thyrotrophin-releasing hormone receptor trhr-r; thyrotropin releasing thr
12	NM_013696		
12	AK016419		
12	NM_025459		
12	AK017714		
12	NM_010109	Elna5	ephrin A5
12	13640		

Figure 8-13

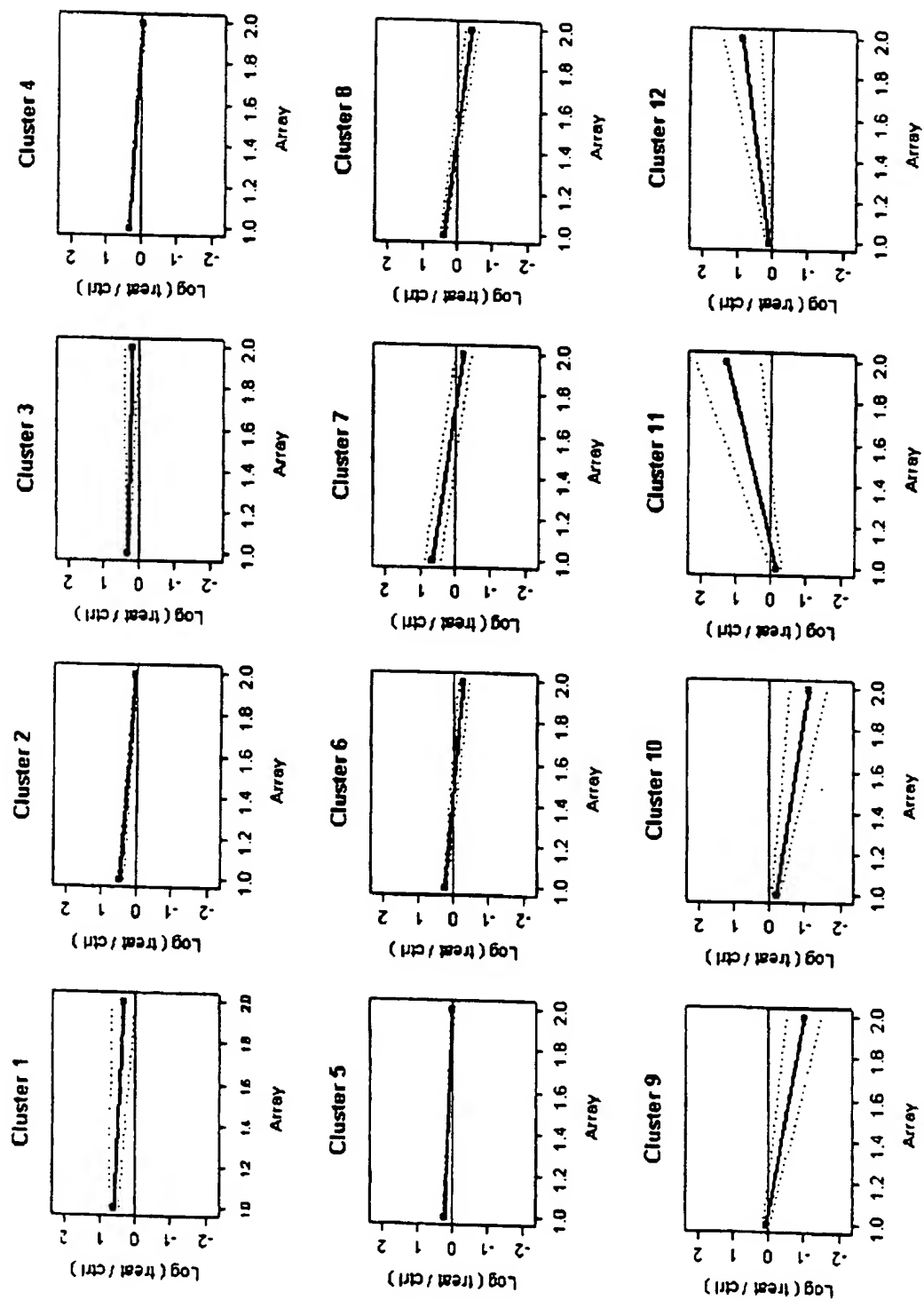


FIGURE 9-1

cluster analysis II
colon cancer
cortex

Cluster	Access	Locus	Gene	Description
1	NM_009814	12373	Casq2	caldesmonin 2
1	NM_030701	80885	Puma-g	putative seven transmembrane spanning receptor puma-g
1	NM_010351	14836	Gsc	goosecoid gsc
1	NM_080638	78388	Mvp	major vault protein
1	AK018420	71469		RIKEN cDNA 8430416G17 gene
1	X72307	15234	Hgf	hepatocyte growth factor
2	NM_009060	19733	Rgn	regucalcin
2	NM_030611	83702	Akr1c6	Akr1c6
2	NM_009420	22024	Tpx1	testis specific gene 1
2	AK015144	73862		RIKEN cDNA 4930415F15 gene
2	NM_018758	57267	Apba3	amyloid beta (A4) precursor protein-binding, family A, member 3
2	AF133300	209102	mor17-1	olfactory receptor mor17-1
3	NM_010547	16151	lkbkg	inhibitor of kappaB kinase gamma
3	NM_019476	29849	Olfir159	olfactory receptor 159
3	AK016628	74427	Eaf1	Eaf1 protein
3	NM_018885	22402	Wisp1	WNT1 inducible signaling pathway protein 1
3	AK006236	76416		nuclear RNA polymerase I small specific subunit [Mus musculus] 83 %
3	AK014260	101437		hypothetical protein FLJ10694; hypothetical protein FLJ10889 [87% Homo sapiens]
3	NM_008930	19113	Prp1e	prolactin-like protein E
3	NM_030728	80982		hypothetical protein, 12H19.01.T7
4	AK003405	101206	tada31	transcriptional adaptor 3 (NGG1 homolog, yeast)-like
4	BC011091	109815	H47	histocompatibility 47
4	NM_008690	18037	Nfkbi	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, epsilon
4	AK020739			
4	NM_007971	14056	Ezh2	enhancer of zeste homolog 2 (Drosophila)
4	NM_011268	19739	Rgs9	regulator of G-protein signaling 9-2 isoform rgs9 rgs9-2 isoform sirialat-enriched alternatively spliced product
5	NM_011505	20913	Stxbp4	syntaxin binding protein 4
5	NM_019924	56613	Rps6ka4	ribosomal protein S6 kinase
5	NM_021481	58866	Treh	trehalase (brush-border membrane glycoprotein)
5	AF233580	107392	Bms1	breast cancer metastasis-suppressor 1
6	NM_010671	16699	Krtap13	keratin associated protein 13
6	AK005166	76500		Similar to mammalian inositol hexakisphosphate kinase 2 [Homo sapiens] 91 %
6	NM_013619	18368	Olf67	olfactory receptor 67
7	AK018444	52504		expressed sequence A1448222
7	NM_020578	57440	Ehd3	EH-domain containing 3
7	AK011451	72149		Similar to amyotrophic lateral sclerosis 2 (juvenile) chromosome region, candidate 2 [50% Human]
8	NM_008899	18992	Pou3f2	POU domain, class 3, transcription factor 2
8	NM_025896	67000	plpi	prolactin like protein I
8	NM_011670	22223	Uchl1	ubiquitin carboxy-terminal hydrolase L1
9	AK020915	67245	Peli1	pellino 1 - ref:NP_075813.1 - pellino 1; RIKEN cDNA 2810468L03 gene [Mus musculus] 100 %
9	NM_010863	17912	Myo1b	myosin IB

cluster analysis II
colon cancer
cortex

FIGURE 9-2

Cluster	Access	Locus	Gene	Description
9	NM_021395	12282	Cab140	calcium binding protein
10	BC011417	74776		inorganic pyrophosphatase [Homo sapiens] 71 %
10	NM_020288	56858	Ors1	odorant receptor S1 gene [Mus musculus] 100 %
10	NM_010289	14610	Gja10	gap junction membrane channel protein alpha 10
10	NM_022007	57780	fyd7	FXYD domain-containing ion transport regulator 7
11	AK018931	73503	Mbd3l	methyl-CpG binding domain protein 3-like
11	NM_013922	30944	Zfp354c	zinc finger protein 354C
11	NM_007923	13714	Elk4	elk4 member of ets oncogene family clone image:3589378
11	AK012394	114896	Afg3l1	AFG3(ATPase family gene 3)-like 1 (yeast
11	NM_012043	26968	Islr	immunoglobulin superfamily containing leucine-rich repeat
11	NM_030726	80978	Gpr90	G protein-coupled receptor 90
11	NM_016675	12738	Cldn2	claudin 2
12	NM_013616	18365	Olfir64	olfactory receptor 64
12	AK013060	17281	Fyco1	FYVE and coiled-coil domain containing 1
12	AK018561	71546		S12207 hypothetical protein (B2 element) - mouse (68% human)
12	AF090891	13012	Cst8	cystatin 8 (cystatin-related epididymal spermatogenic)
12	NM_010340	14765	Gpr50	G-protein-coupled receptor 50

Figure 9-3

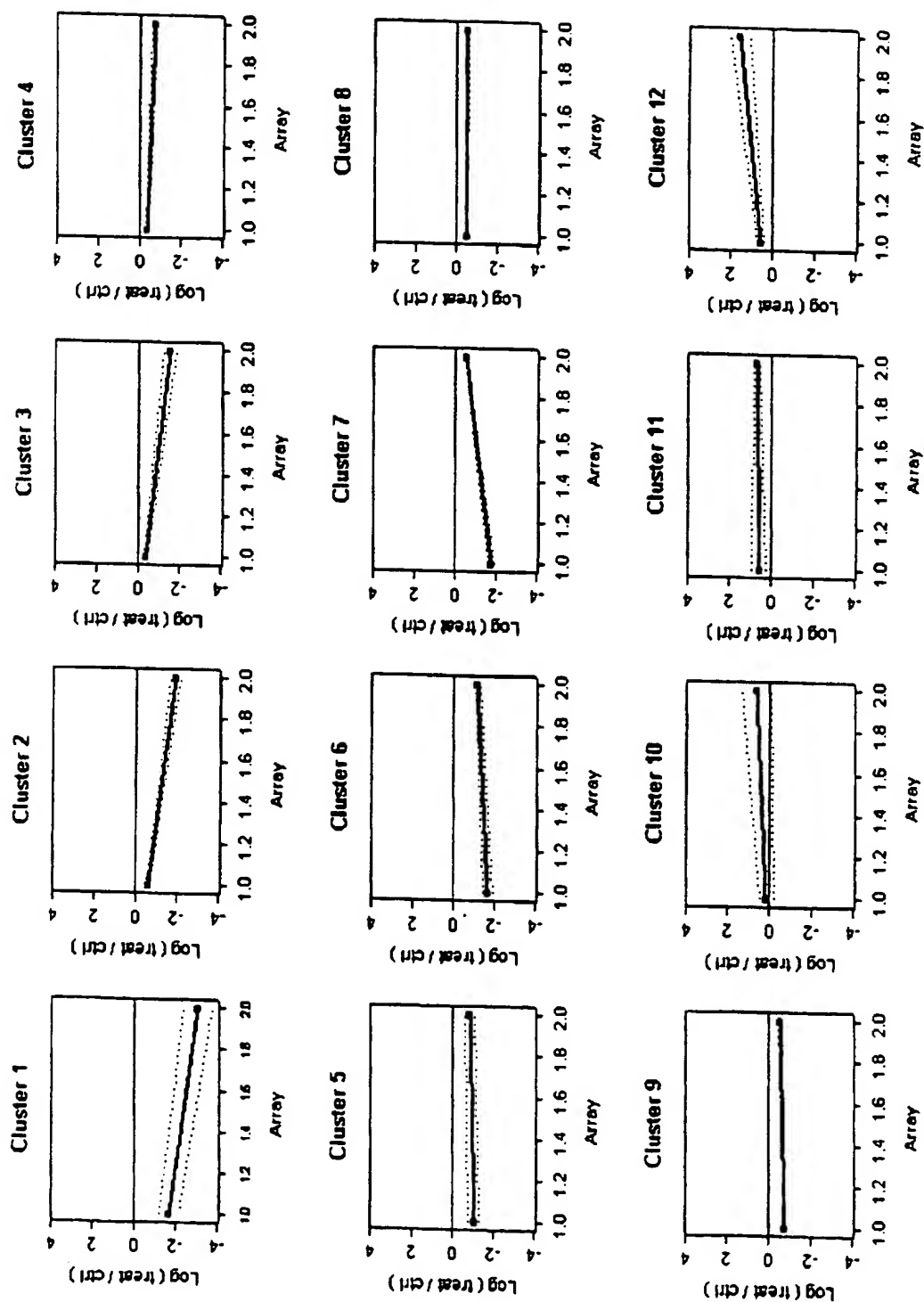


FIGURE 10-1

Cluster	Access	Locus	Gene	Description
1	AK004814	97541	Rad9	SYO_HUMAN Glutaminyl-IRNA synthetase (Glutamine-IRNA ligase) (GLNRS) 90.06 %
1	NM_011237	19367	Rad9	RAD9 homolog (S. pombe)
1	NM_016674	12737	Cldn1	claudin-1 integral membrane protein localizing at tight junctions; claudin clone ngc:7582
1	AK015921	75209		A43244 synaptic vesicle protein SV2 (59% rat)
1	BC002230			similar to hypohelical protein FLJ10008 (Homo sapiens)
1	AK011610			
1	AJ223472		Evc	Ellis van Creveld gene homolog (human)
1	NM_021292	59056	Tlr4	tol-like receptor 4
1	AK014533	21898		
1	AK004406		Sgca	sarcoglycan, alpha (dystrophin-associated glycoprotein)
1	AK016926	20391	Dnm	dynamn
1	NM_009181	13429		
1	L31395		H2-M2	histocompatibility 2, M region locus 2
1	AK009986	14900		T2D3_HUMAN Transcription initiation factor TFIIID 135 kDa subunit (TAFII-135) (TAFII-130) 26 %
1	M26156	74026	Pam	peptidylglycine alpha-amidating monooxygenase
1	AK015926	18484		
1	NM_005378	21824	Thbd	thrombomodulin
1	BC005517		Bazf	beta6-associated zinc finger protein bazf
1	NM_007528	12029	Srsf2	sommatostatin receptor type ss12 alternatively spliced srsf2; srsf2
1	NM_009217	20606		Similar to FKBP5_HUMAN FKBP5-binding protein 6 (FKBP-38) (Peptidyl-prolyl cis-trans isomerase) (PPIase) (Rotamase) (h. sapiens 28%)
1	AK008753	70387		
1	NM_011128		Vcam1	vascular adhesion cell molecule-1 vcam1 exon 10
1	NM_011693	22329	Tnfrsf11	T47144 hypothetical protein DKFZP761E1347.1 - human (fragment) (40% human)
1	AK016865	71164		transmembrane 7 superfamily member upregulated in kidney clone ngc:7085; tm7.s11
1	NM_031999	83924	Nud19	nudix (nucleoside diphosphate linked moiety X)-type motif 9
1	AK004444	74167	Mscp	mitochondrial solute carrier protein
1	AK019700	67712	Miz1	Max-interacting-zinc finger
1	NM_011367	17344	Tcf15	paraxial basic-helix-loop-helix protein
1	NM_008602	21407		
1	NM_009328		Zfp361	zinc finger protein 36, C3H type-like 1
1	AK008726	12192	Galnt1	udp-n-acetyl-alpha-4-glucosamine-6-acetylneuraminy- galactosylglucosyltransferase beta-1 4-n-acetylglucosaminyltransferase gngt2
1	NM_007564	14421	Fv1	F10861 anti-silencing protein ASF-1 homolog DKFZp547E2110.1 - human
1	NM_008080	66403		Friend virus susceptibility 1
1	NM_025541	14349		10 day old male pancreas riken cDNA clone:1810029g24
2	AK007641	66286		Similar to hypohelical protein CG003 [53% Homo sapiens]
2	AK010886	72313	Prkx2	Similar to TF-3A_HUMAN Transcription factor IIIA (Factor A) (TFIIIA) 56%
2	AK012733	76366	Snrg	secretory protein bvb
2	NM_015768	50501		small nuclear ribonucleoprotein polypeptide G [Mus musculus] 100 %
2	NM_026506	68011	G6pdh	glucose-6-phosphate dehydrogenase X-linked
2	NM_008062	14381	Ar3	arrestin 3, retinal
2	AF156379	170735	Citcd	chloride intracellular channel 4 (mitochondrial)
2	NM_013885	29876	Kif21a	kif21a kinesin-like protein
2	NM_016705	16564		
2	NM_021363		Nun1	novel leucine zipper testicular protein
2	NM_026457	67826	Cox7a1	es cells riken cDNA clone:2410018g20
2	AK010544	72083	Rbp1	cytochrome c oxidase subunit viia-h precursor cox7ah nuclear encoding mitochondrial protein
2	NM_009544	12865		13 days embryo head riken cDNA clone:3110058m11
2	NM_020599	19771		
2	NM_024253			RIKEN cDNA 493143D01 [Mus musculus]
2	NM_028889	98363		expressed sequence A1604832
2	AK017416	102566		
2	BC002294		Pold2	polymerase (DNA directed), delta 2, regulatory subunit
2	NM_023876		DnaJ3	DnaJ (Hsp40) homolog, subfamily C, member 3
2	AK017655			
2	NM_016742	18972		
2	NM_008894	19107		
2	NM_008929			

FIGURE 10-2

Cluster Access	Locus	Gene	Description
2 AK008822	14282	Fosb	nsp-like 1 protein nsp1 lma-sec and fosb; aa 1-338
2 NM_008036			
2 AK006713	50754	Fbw7	F-box and WD-40 domain protein 7, archipelago homolog
2 NM_080428	24071	Syn2bp	adult male small intestine riken cDNA clone:2010002n14, synaptophysin binding protein syn2bp
2 NM_025282	18155	Proc	preprokinectin
2 C59055	68612	Ube2c	ubiquitin-conjugating enzyme E2C
2 AK003722			
3 NM_009368	58325	Abcb9	atp-binding cassette protein abcb9 atp binding abc transporter; bap
3 NM_019875	17260	Mef2c	myocyte enhancer factor 2c mef2c
3 NM_025282	74446		adult male testis riken cDNA clone:4933425K02
3 AK016917	14913	Gucalc	guanylate cyclase activator 1a (relina)
3 NM_008189	13411	Dnahc11	dynein axon heavy chain 11 dnahc11
3 NM_010060	58242	Nudt11	nudix (nucleoside diphosphate linked moiety X)-type motif 11
3 AB041578	68230	Mps28	mitochondrial ribosomal protein S28
3 AK011036			
3 NM_009445			
3 NM_013538	14793	Gcc8	gene rich cluster, C8 gene
3 NM_019517			
3 AK012054	72519		
3 NM_008633	17756	Mtap4	microtubule-associated protein msp4 alternative splicing; adult male lung riken cDNA clone:1200010K05
3 NM_030750	81535	Sgpp1	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
3 NM_011949	Unknown		
3 AK016480	72230	Kcnk4	adult male testis riken cDNA clone:4931428K02
3 AK005691	16492		M9636 DNA-binding protein - mouse 58 %
3 NM_021275			potassium voltage gated channel shaker related subfamily member 4 kcnk4
3 AF332067			
3 NM_019850	19060	PtpSc	protein phosphatase 5 pps ser/tlr
3 AF018262	76742		SNXH_HUMAN Sorting reclin 17 (25% human)
3 AK017836			
3 NM_025785	73383	Nduif4	adult male testis riken cDNA clone:1700056e22
3 AK006611	17993	Mpv17	nadh dehydrogenase ubiquinone l-e-s protein 4 18 kDa ndufsa4; 13 days embryo liver riken cDNA clone:2510049c12
3 NM_010887	17527		mpv17
3 NM_008622	16420	Itpb6	integrin beta-8 subunit integral membrane protein
3 NM_021359	56409	Nudt3	nudix (nucleoside diphosphate linked moiety X)-type motif 3
3 NM_019837	16665	Krt1-15	keratin complex 1, acidic, gene 15
3 NM_008469	19224	Pigs 1	prostaglandin-endoperoxide synthase 1
3 NM_008969			
3 BC003984			
3 NM_009442	66132		similar to Y391_HUMAN Hypothetical protein KIAA0391 75 %
3 AK008749			
3 NM_021493			
3 AK005633			
3 BC006063	107771	Bmyc	brain expressed myelocytomatosis oncogene
3 AK013780	11933	Alp1b3	alk-alphase beta-3 subunit alp1b3
3 NM_007502	52033	Touk	T-LAK cell-originated protein kinase
3 NM_023209	14764	Gpr44	putative g-protein coupled receptor cdr2
3 NM_009962	75311		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930550C14 product: hypothetical ID calmodulin-binding motif containing protein
3 AK015083	66410		CGI-12 protein (81% human)
3 NM_073547	71910		Similar to HTPAP protein [92% Human]
3 AK009435			
3 AF125314	20451	Slat8c	sialyltransferase alpha-2 8-sialyltransferase c slat8c
3 NM_009182			
3 NM_008085			
3 NM_011429	12929	C-ksl	crkl protein
3 NM_007764	69870		RIKEN cDNA 2010003119 gene
3 AK008069			
3 NM_025283			
3 AK007369			
3 AK004759	15399	Hoxa2	homeobox protein hox-1.11
3 NM_010451	87112	Fgf22	fibroblast growth factor 22
3 AK008922	71236		habdoid tumor deletion region protein 1 [Homo sapiens] 60.99 %
3 AK017008			

FIGURE 10-3

Cluster Access	Gene	Description
3 NM_026495	RIKEN cDNA 0610020102 gene	
3 NM_009228	Snlal1	synthetase, acidic 1
3 NM_021305	Sec81a2	sec81 alpha subunit 2 s. cerevisiae clone mgs-6359; sec81a2
3 AK007508		stomatin-like 1; stomatin-like protein 1 (75% human)
3 NM_025406	Pcsk4	proprotein convertase subtilisin/kexin type 4
3 O01093		
3 AF145716		
3 NM_020579		
3 NM_023395		
3 NM_008896		
4 AK012967		ENC1, MOUSE Ectoderm-neural cortex-1 protein (ENC-1) 80 %
4 AK012283		RIKEN cDNA 2700023J09 gene
4 NM_026177		RIKEN cDNA 1200011118 gene
4 NM_021495	Pvrl3	pollinosis receptor-related 3; nectin-3 alpha; nectin-3 beta; nectin-3 gamma [Mus musculus] 100 %
4 BC004783	Gm12	hypothetical protein FLJ13782 (94% human)
4 AB003433	Cry2	photolyase/blue-light receptor homolog2; cryptochrome 2 cry2
4 AK002744		
4 NM_020259		
4 NM_018769		
4 NM_013471		
4 NM_008413		
4 AK007796	Jak2	Janus Kinase 2
4 AF119384		
4 AK019361		CAMP [Mus musculus] 100 %
4 BC017625		
4 AK003472	Ras66	Ras association (RalGDS/AF-6) domain family 6
4 BC013717		S50853 translation releasing factor eRF-1 (89% human)
4 AF282293		
4 NM_009123	Nrx1-2	NK1 transcription factor related, locus 2 (Drosophila)
4 NM_019742		chromosome 20 open reading frame 108 [Homo sapiens] 77 %
4 BC016210	Cull2	cul drosophila-like 2 cull2
4 NM_007804		T12515 hypothetical protein DKFZp434B103.1 - (28% human)
4 AK014905		
4 AK005138		
4 NM_013889		
4 AK002371		
4 NM_023284		
4 NM_020503		
4 AK017600		
4 BC002286	Circ5	chloride intracellular channel 5
4 AK006092		RIKEN cDNA 2310002F.18 gene
4 NM_007554	Cop	Similar to MOUSE Alpha-actinin 3 (Alpha actinin skeletal muscle isoform 3) (F-actin cross linking protein) 28%
4 NM_007583	Cenpc	carboxypeptidase d cpd
4 NM_017394	Sic2a10	centromere autoantigen C
4 NM_032004	Ssik	solute carrier family 7 (cationic amino acid transporter, y+ system), member 10
4 NM_026417		serine/threonine protein kinase SSTK
4 AK010658		RIKEN cDNA 2310034L04 gene
4 AK004524		Mus musculus 18-day embryo whole body cDNA, RIKEN full-length enriched library, clone:1190009E12 product:hypothetical SOCS domain, C-terminus of STAT-inhibitors containing protein
4 AF320615	Fg11	fibroblast growth factor 1
4 X82786	Mhi67	Mus musculus Tni receptor-associated factor 3 (Tra3) gene, partial sequence; and amnionless precursor protein (Amn) gene
4 NM_011795	C1orf	T30249 cell proliferation antigen Ki-67 - mouse 100 %
4 NM_023051	Cstn1	C1q related factor
4 AF282303		calysteinin-1 protein
4 AK016792		
4 NM_008521	Lic4s	leukotriene cd synthase
4 NM_025751		RIKEN cDNA 4933425L06 gene
4 AK019824	Oas1g	sialyltransferase 4c; ST3Gal IV [93% Mus musculus]
4 BC018470	Tinf2	2-5 oligoadenylate synthetase 1G
4 AF214013		Terf1 (TRF 1)-interacting nuclear factor 2

FIGURE 10-4

Accession	Gene	Protein	Description
4 NM_028717	Als2	74018	amyotrophic lateral sclerosis 2 (juvenile) homolog (human)
4 AK006960			
4 AK020308	Rnf30	58522	muscle-specific ring-finger protein muf1
4 NM_021447			
4 AK014535	Il17r	16172	interleukin 17 receptor
4 NM_008359	Roa1	68275	11 days pregnant adult female ovary and uterus riken cDNA clone:5031405x23
4 AK019654	Dbl	13167	diazepam binding inhibitor
4 NM_007830			
4 AK016880	Gba1	74185	glucan (1,4-alpha-), branching enzyme 1
4 NM_028803			
4 NM_009551	Mpr23	71463	16 days embryo lung riken cDNA clone:8430422m09
4 AK018435		19935	mitochondrial ribosomal protein L23
5 NM_011288	Calna2	12386	calenin alpha 2 calna2
5 AK007546		74534	RIKEN cDNA 8430423J23 gene
5 NM_009819			
5 AK018447	Ned1	94332	nectin-like 1
5 AK007841			
5 NM_026437	Hlx9	15285	homeodomain protein hlx9
5 NM_053199		74182	RIKEN cDNA 2310032D16 gene
5 NM_019944			
5 AK009137	Ms4a6c	73656	membrane-spanning 4-domains, subfamily A, member 6C
5 BC003298			
5 NM_028595			
5 AK014636			
5 BC003867			
5 AK017419			
5 AF146569	Sdc4	20971	syndecan 4 clone mgc:11456; ryudocan core protein
5 NM_011521			
5 AK010430			
5 NM_013822			
5 NM_023670	Trn4s16	56496	transmembrane 4 superfamily member 6 clone mgc:5801; trn4s16
5 NM_019656			
5 NM_026125		68659	AD021 protein (88% human)
5 AF285091			
5 NM_022020			
5 NM_019833			
5 NM_023844			
5 NM_016772	Ech1	51798	peroxisomal/mitochondrial diacyl-coa isomerase ech1p ech1
5 NM_025559			
5 AK018312			
5 NM_011086			
5 NM_010022	Dbl	13171	dihydroisamide branched chain transacylase e2 dbl
5 NM_022565	Nds14	64580	N-deacetylase/N-sulfotransferase (heparin glucosaminyl) 4; N-deacetylase/N-sulfotransferase 4 [Mus 100 % /
5 NM_010722	Lrmb2	16907	lamin b2
5 NM_009377			
5 NM_018660	Mydip	56309	c-myc binding protein
5 AK018292		76237	RIKEN cDNA 8430628N08 gene
5 L10319			
5 BC011370		68137	S13293 KDEL receptor - (99% human)
5 NM_008804			
5 AK017433		71435	RIKEN cDNA 5530401C11 gene
5 AK007129			
5 NM_025638		66566	RIKEN cDNA 2310079N02 gene
5 AK014610	Xist	74352	Similar to 148208 zinc finger protein 30 - mouse 44%
5 X59289		213742	inactive X specific transcripts, gene with no protein product
5 NM_010016	Morc	17450	microorchidia
5 AK021221		78444	similar to sp:09NXJ5 - PCPL_HUMAN Probable pyrrolidone-carboxylate peptidase (5-oxopropyl-peptidase) (Pyroglutamy-peptidase 46 %
5 NM_019650	Gor2	56494	sec22 vesicle trafficking protein-like s. cerevisiae clone mgc:6437; gor2 snare gs27
5 NM_011540			
5 BC018324			
5 NM_026338		61722	RIKEN cDNA 4921517D21 gene

FIGURE 10-5

Cluster Access	Locus	Gene	Description
5 NM_031402	73833		T08675 hypothetical protein DKFZp564F0522.1 - human (fragment) 49 %
5 AK003496			
5 AK010756			
5 AK015536			
5 AK012275	67488	Kcnv1	potassium channel, subfamily V, member 1
5 AK008016			
5 AK020115			
5 NM_016888			
5 AK004655	53625	B3gnt1	udp-glucose:beta-1,3--acetylglucosaminyltransferase b3gnt1; clone mgc-6892
5 AF109506	74107		hypothetical protein FLJ10540 [Homo sapiens] 79.28 %
5 AK003845			
5 NM_019695			
5 AK008713			
5 NM_021527	70388		leucine-rich and death domain containing; p53 protein induced, with death domain [Mus musculus] 40.00 %
5 AK009812			
5 AB037596	14538	Gcnl2	glucosaminyltransferase, 1-branching enzyme
5 BC006876	68038		hypothetical protein MGC33234 [88% Homo sapiens]
6 NM_025567			
6 NM_009354	21752	Tert	telomerase reverse transcriptase mter; catalytic subunit
6 NM_007733	12823	Col19a1	adult male testis riken clone:4931428013 full insert sequence; collagen a1 xii chain
6 NM_018790	11838	Aic	growth factor arc
6 AK015384			
6 AK014338			
6 AK005311			
6 NM_011575	21766	Ttr3	ttr3/tf1 trefol1 factor 3/intestinal protein exons 1-3
6 AK004963	76281		Tax interaction protein 1 [Homo sapiens] 99 %
6 AF109908			
6 NM_011377	20465	Sim2	single-minded 2
6 NM_007978			
6 NM_021609	59289	D6	beta-chemokine receptor d6
6 AB041680	230991		brain cdna clone mtrcb-3966 unnamed protein product
6 AK015345			
6 AK006800	74270	Usp20	ubiquitin specific protease 20
6 X70920	17072	Ly6g	lymphocyte antigen 6 complex, locus G
6 NM_017464	18003	Nedd9	neural precursor cell expressed developmentally down-regulated 9 nedd9; clone image:3499250
6 AF121236			
6 NM_011080	18686	Phx1	per-hexamer repeat gene 1
6 AK005568			
6 AK008013			
6 AK004090	73747		RIKEN cDNA 111003AG24 gene
6 NM_013827	17765	Mit2	metal response element binding transcription factor 2
6 NM_009508			
6 NM_009352			
7 NM_019746	21749	Tert1	telomeric repeat binding factor 1
7 AK006699			
7 NM_011714			
7 AK020277			
7 U82439	19276	Ptpn2	protein tyrosine phosphatase la-2/beta ptp an autoantigen in insulin-dependent diabetes mellitus; phosphotyrase-pp ptp-pp receptor
7 X65562	12034	Col6a2	collagen alpha-chain type vi; alpha-2
7 AK015740			
7 AK005479			
7 NM_028785	74146		RIKEN cDNA 1200017A24 gene
7 AK010472	69747		RIKEN cDNA 2410012H22 gene
7 AK009343			
7 NM_007753			
7 NM_011966	26441	Psmc4	prolactosome proteasome subunit alpha type 4 clone mgc:5640; psmc4
7 NM_013848	27028	Ermap	erythroblast membrane-associated protein
7 BC012272			
7 NM_008077	14415	Gad1	glutamic acid decarboxylase 1
7 NM_011202			
7 AK005586			
7 NM_031398			

FIGURE 10-6

Cluster Access	Locus	Gene	Description
7 NM_024277 7 AK008928 7 NM_019483 7 NM_009271 7 AK009218 7 NM_010946 7 AF073881 7 AK012006 7 AK016817 7 NM_008829 7 NM_010080 7 NM_008323 7 NM_008951 7 AJ133536 7 NM_011040 7 AK005056 7 NM_021336 7 NM_021512 7 AK007351 7 NM_008675 7 AK002581 7 AK015166 7 U37501 7 NM_031168 7 NM_009333 7 NM_020582 7 NM_010765 7 NM_010301 7 AB008392 7 NM_011538 7 AK005564 7 AK013708 7 NM_026401 7 NM_009902 7 NM_019709 7 NM_023784 7 NM_018871 8 AK005816 8 NM_010151 8 AF435852 8 AK008896 8 NM_024268 8 NM_008163 8 AF292339 8 AK014696 8 NM_009115 8 AF330257 8 NM_010174 8 NM_008274 8 AK015327 8 AK016282 8 NM_008887 8 AK012717 8 AF187099 8 U87866 8 BC004774 8 NM_013609 8 NM_018760 8 AK015267 8 AK004878 8 NM_022025 8 AK009217	55984 20779 18203 210376 72512 17690 13517 15929 19185 20855 18510 59015 69038 17965 74902 16776 16193 21416 57423 15388 21389 68379 12739 22628 13865 20203 15432 19288 75415 69049 18805 97998 54403 63993 69511	Madh9 Src Nlan1 Msi1h Dsup Ish3g Pmd4 Syd11 Pax8 Nup160 Nbl1 Lama5 Ilg Tcf7l2 Atp5f2 Hnrp1 Tbx6 Clz1 Clon3 Ywhag Nr2f1 S100b Hoxd12 Plx3 Cmt5 Plcl1 R75183 Sic4a4 Sic5a7	snai8 protein neuronal proto-oncogene c-src encoding tyrosine-specific protein kinase n-terminal asparagine amidohydrolase ntan1 RIKEN cDNA 9430075G12 gene 10 days embryo riken cdna clone.2610307008 musashi-1 homolog drosophila msh1h denlin sialophosphoprotein isocitrate dehydrogenase nad+ gamma lch3g prolactosome (prosome, neuropeptide) 26S subunit, non-ATPase, 4 synaptobrevin like 1 paired box 8 par8 nucleoporin chromosome 11 open reading frame 10 [Homo sapiens] 100 % neuroblastoma, suppression of tumorigenicity 1 plectin 1, intermediate filament binding protein, 500kD [Homo sapiens] 25.74 % laminin alpha-chain lanes5 basal lamina/basement membrane component interferon il6 transcription factor 7 like 2, T-cell specific, HMG-box ATP synthase, H+ transporting, mitochondrial F0 complex, subunit f, isoform 2 protein 1 mpr1: ribonucleoprotein transcription factor txb6 description: t-box Ctjp1-interacting zinc finger protein claudin 3 cdh3; claudin-3 3-monooxygenase/tryptophan 5-monoxygenase activation protein, gamma polypeptide ovalbumin upstream promoter transcription factor 1 coup-ffi 1 subunit comments: homodimer subunit s: coup-ffi1 S100 protein, beta polypeptide, neural hox-4.7 penixan related gene RIKEN cDNA 2810011M08 gene camello-like 5 phosphatidylcholine-specific phospholipase d1b mpd1 mpd1b d1; pld1 expressed sequence R75183 solute carrier family 4 (anion exchanger), member 4 solute carrier family 5 (choline transporter), member 7 KLKC_HUMAN kallikrein 12 precursor (kallikrein-like protein 5) (KLK-L5) 70 %

FIGURE 10-7

Cluster Access	Locus	Gene	Description
8 NM_025424 8 NM_021202 8 AK015647 8 NM_010803 8 AK004892 8 AK008201 8 NM_010830 8 NM_019518 8 NM_026167 8 NM_005973 8 NM_024267 8 AK004004 8 D29987 8 AF057287 8 NM_008260 8 AK017705 8 NM_008238 8 NM_017483 8 NM_011657 8 AK014837 8 NM_033269 8 NM_019968 8 NM_017404 8 AF388969 8 BC004098 8 AK013833 8 NM_011917 8 NM_023371 8 NM_008938 8 AK008355 8 AK007258 8 AK008020 8 AK020315 8 AK015455 8 NM_020493 8 NM_010917 8 NM_019445 8 NM_007558 8 NM_007469 8 AF375046 8 AK017756 8 NM_007807 8 AJ253897 8 AK020883 8 NM_009212 8 NM_007531 8 AK017134 8 AK005930 8 NM_008851 8 AK010400 8 AK015090 8 NM_029199 8 NM_013899 8 NM_009329 8 AB043325 8 NM_010908 8 AK018191 8 NM_023617 8 NM_007457 8 NM_021313 8 AK012812 8 NM_008353	75909 17986 74130 17688 56149 12992 15377 70573 15374 18515 12671 27393 24128 19133 Unknown 18073 54418 54392 13058 20589 74470 75185 30059 21408 17391 71724 11769 16161	Ndph Msh6 Grasp Cand Foxo3 Hhl Fox2 Chrm3 Mpi39 Xrn2 Rds Nid1 Fnm2 Hcagp Cybb Ighrbp2 Timm13a Zfp354b Mmp24 Ap1s1 Il12b1	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930468L2.1 product:inferred: RIKEN cDNA 4930468L2.1 gene / putative [Mus musculus] Norrie disease homolog Similar to hypothetical protein FLJ22004 [Homo sapiens] 89 % mus homolog 6 (E. coli) brain cDNA clone mncb-4428 gp1-associated scaffold protein grasp unnamed product casein delta forkhead box o3 [oxa3] hypothetical protein FLJ10560 [Homo sapiens] hematological and neurological expressed sequence 1 pre B-cell leukemia transcription factor 2 pbx2 ACM_MOUSE Muscarinic acetylcholine receptor M3 (Mn3 mAChr) 100 % / 10 day old male pancreas riken cDNA clone:1810033d11; unknown c21orf8 5-3 exoribonuclease 2 retinal degeneration, slow (retinitis pigmentosa 7) adult male testis riken cDNA clone:1700123m18 enkephalin precursor aa -28 to 1217; nidogen preindogen formin 2 chromosome condensation protein G gp91phox cybb heme binding membrane glycoprotein also flavin and nadph domains, is associated with a 22 kd peptide p22phox to for immunoglobulin mu binding protein ighrbp2 RIKEN cDNA 4933440J22 gene RIKEN cDNA 4930542N07 gene translocase of inner mitochondrial membrane 13 homolog a (yeast) zinc finger protein klf1 putative: klf1 membrane-type-5 matrix metalloproteinase mt5-mmp; membrane-type 5 RIKEN cDNA 1200011D03 gene clathrin-associated protein 19 ap 19 interleukin 12 receptor, beta 1

FIGURE 10-8

Cluster Accession	Gene	Description
9 AK012532	Ros15	ribosomal protein s15 rps15
9 AK018473	Ab5	ankyrin repeat and SOCs box-containing protein 5
9 NM_009091		lcr beta locus from bases 250554 to 501917 section 2 of 3 the
9 AF398966		A39740 sterol 27-monoxygenase (EC 1.14.14.-) cytochrome P450 27, precursor - (74% human)
9 AE000664		sushi-repeat protein [Homo sapiens] 93 %
9 NM_024264	Sy11	synaptotagmin xi
9 AK005168		adult male testis riken cdna clone:1700028b15
9 AK004171		escp1 cytokine secreted protein
9 NM_018804	Ly96	TLH29 protein precursor [Homo sapiens] 63 %
9 AK006446		emr1 a seven transmembrane hormone receptor that contains egl-like motifs
9 NM_015923		alpha-L-iduronidase idua
9 AK010014		adult male liver riken cdna clone:1300013f15
9 U66888		Mus musculus mitochondrion, complete genome
9 AK009114	md-Nd8	semra domain, immunoglobulin domain (ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4A
9 NM_007884		proline rich protein 2 [Mus musculus] 34 %
9 NM_008325		cd1 integrin alpha v subunit vitronectin receptor
9 NM_029682		tumor-suppressing subchromosomal transferable fragment 3
9 AK004989		sarcoendoplasmic reticulum cal2+ alipase sarta2b
9 NC_001569		chemokine (C-C motif) ligand 2
9 AK004148		KIP1_MOUSE DNA-PKcs interacting protein (Kinase interacting protein) (KIP) (Calcium and integrin-bin 43 %
9 NM_009401		B59254 myosin heavy chain 12, splice form2 - human 29 %
9 NM_013658		rod photoreceptor rpr1
9 AK002350		platelet glycoprotein ib-alpha membrane receptor subunit von willebrand factor receptor surface
9 NM_008402		
9 NM_009434		
9 AJ131821		
9 AK014485		
9 NM_080433		
9 NM_025419		
9 NM_011333		
9 NM_007440		
9 AK006870		
9 AK013780		
9 NM_007411		
9 NM_018748		
9 NM_024458		
9 NM_010326		
9 NM_016846		
9 NM_025400		
9 NM_011908		
9 NM_020603		
9 AK016622		
9 NM_007833		
9 NM_016813		
9 NM_021520		
9 NM_011294		
9 AK008493		
9 AF059175		
9 BC004632		
9 NM_008020		
9 AK020653		
9 AK013505		
9 NM_025295		
9 AK007452		
9 NM_010349		
9 AK016634		
9 NM_008996		
9 NM_019818		
9 NM_009453		
9 NM_013602		
9 AK013274		
9 AK016052		

FIGURE 10-9

Accession	Label	Gene	Description
9 AK015700	74694	Sell	T48685 hypothetical protein DKFZp761D1823.1 (36% human)
9 NM_011346	20343	Sell	selectin, lymphocyte
9 NM_010920	17475	Mpdz	multiple PDZ domain protein
9 NM_009573	22771	Zic1	zinc finger protein of the cerebellum zic1
9 NM_018905	54710	H43a13b	d-glycosaminyl 3-O-sulfotransferase-3b 3-osl-3b
9 NM_013988	30058	Timm8a	translocase of inner mitochondrial membrane 8 homolog a yeast clone mpc-6730; timm8a
9 AK017352	75736		BCCL2-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
9 NM_011602	21894	Tin	tin
9 AK004508	68942		T12468 hypothetical protein DKFZp564O123.1 - human 97 %
9 NM_011035			
9 V00711			
9 AK005570	73493		S22373 proline-rich protein -427% M.musculus
9 AK006938	27380	Tcl1b4	T-cell leukemia/lymphoma 1B, 4
9 NM_013774			
9 NM_030723	77225		Mus musculus adult male diencephalon cDNA, RIKEN full-length enriched library, clone:3330181L09 product: hypothetical protein
9 AK020378	11844	Arl5	adp-ribosylation factor 5 arf5
9 NM_007480			
9 AK008844			
9 NM_008456	78109		adult male testis riken cDNA clone:493043020
9 AK019589			
9 AB016602			
9 AK010084			
9 AK006481	17695	Msrnb	beta-microseminoprotein; beta-inhibin; prostatic inhibin protein [Mus musculus]
9 NM_020597	13012	Cslb	cystatin 8 (cystatin-related epididymal spermatogenic)
9 AF090691	235339	Dial	dihydrolipamide S-acetyltransferase (E2 component of pyruvate dehydrogenase complex)
9 AY042655			
9 AK017510	21813	Tgfr2	transforming growth factor beta receptor II (tgfr2)
9 NM_009371			
9 AK011571	210148	Sic30a6	soluble carrier family 30 (zinc transporter), member 6
9 BC005753	71887	Pp2cz	protein phosphatase 2a, catalytic subunit, zeta isoform
9 AK009235			
9 NM_012029	56334	Rnp24	coated vesicle membrane protein
9 NM_019770			
9 AK005731	68195		ribonuclease 6 precursor [Homo sapiens] 67 %
10 AK015947	12846	Cry	complement receptor related protein
10 M34173	73314		SHO2, HUMAN Leucine-rich repeat protein SHOC-2 (Ras-binding protein Sur-8)(33% M.musculus)
10 AK006601	15373	Hmc3	adult male liver riken cDNA clone:1300017a15
10 BC016444	71062		RIKEN cDNA 4933407G07 gene
10 AK016718			
10 NM_010275	93685	Lysal2	lysosomal apyrase-like 2 [Mus musculus] 100 %
10 NM_053103	66091	Ndufa3	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3
10 AK006243	58243		hypothetical protein, MNCB-0385 [Mus musculus]
10 NM_021432	16821	Lcn4	lipocalin 4
10 NM_010695	12551	Cdh10	12-cadherin
10 U69137	12668	Cor8a	adult male kidney riken cDNA clone:0610011c24
10 NM_007750			
10 NM_013732			
10 AK002788			
10 NM_018810	56752	Aldh3a1	aldehyde dehydrogenase 3a ald3a1
10 NM_019993	50492	thop1	thimet oligopeptidase 1
10 NM_022653			- 138487 tastin - human 51.90 %
10 BC005574	78733	Scya28	smad inducible cytokine a28 scya28
10 AK021408	56638		
10 NM_020279			
10 NM_025989			
10 AK003377			
10 AK003123	68235		RIKEN cDNA 2410066E13 gene
10 NM_026629			
10 NM_025921			
10 BC004759	83770	Tas1r2	candidate taste receptor 11/2 g protein coupled
10 NM_031873	77125		DVS27-related protein [Homo sapiens] 51 %
10 BC003947			

FIGURE 10-10

Cluster Access	Locus	Gene	Description
10 NM_030684	94094	Trin34	tripartite motif protein 34
10 NM_023465			
10 NM_020520	57279	Slc25a20	solute carrier family 25 (mitochondrial carnitine/carnitine translocase), member 20
10 AK019768			
10 AK017550			
10 BC003865	17857	Mx1	myxovirus (influenza virus) resistance 1
10 NM_010846	12770	Crtkbr111	macrophage inflammatory protein-1 alpha receptor-like msp-1 receptor like-1
10 NM_007178	97064		transcriptional co-activator with POU-binding motif (TAZ) [91% Homo sapiens]
10 BC004640	18134	Nova1	neuro-oncological ventral antigen 1
10 AF232828	20371	Zfp57	zfp-57
10 NM_009559	73993	Foxp3	FOX P3, MOUSE Forkhead box protein P3 (Scurlin) 100 %
10 NM_054039			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone 4930448A20 product undassifiable
10 AK015411			
10 BC018287			
10 NM_025384			
10 NM_019819			
10 AK002826	67657	Rab13	RAB, member of RAS oncogene family-like 3
10 AK016099	26893	Cops6	COP9 (constitutive photomorphogenic) homolog, subunit 6
10 AF071315	13638	Elna3	elphin A3
10 U92865	22092	Tsga2	testis specific gene A2
10 NM_025290	72852		RIKEN cDNA 2900024010 gene
10 AK013594	17164	Mapkapk2	MAP kinase-activated protein kinase 2
10 X76850	59038	Pmpa4	peroxisomal membrane protein 4
10 NM_021534			
10 AK016908	71421	Timp	6 days neonate head riken cDNA clone:5430427o21
10 AK017352	21857		tissue inhibitor of metalloproteinase 1
10 NM_011553			
10 NM_013818			
10 NM_016750	51788	H2af2	histone H2a.2
10 NM_009155	20363	Sepp1	selenoprotein P, plasma, 1
10 NM_011550	21428	Tcf4	transcription factor like 4 tcf4
10 NM_010670			
10 NM_008696	26921	Mapk4	mitogen-activated protein kinase kinase kinase kinase 4
10 AK009074	107734	Mpl30	mitochondrial ribosomal protein L30 [86% Homo sapiens]
11 L42336			Mus musculus sodium channel 207 mRNA, 3 end
11 AK020352			
11 NM_008734	18183	Nrg3	neuregulin 3
11 AK017096	71275		adult male testis riken cDNA clone:493343705
11 AK015280	73986		Transcription factor BTF3 (RNA polymerase B transcription factor 3) (60.63% Mus musculus)
11 NM_007767	12937	Pcdha8	protoderm alpha 6
11 NM_010852	17910	Myo15	Myo15
11 AK006511			
11 NM_011750	22668	Zfp162	zinc finger protein 162
11 NM_019460			
11 AF293079	18360	Olfir6	olfactory receptor 6
11 NM_013564			
11 NM_033398	107817	Pdsr	clone mpc:8280
11 NM_013117	27078	Eppb9	endothelial precursor protein B9
11 NM_022984	57264	Retn	reticulin retn
11 NC_001569	17722	mt-Nd6	Mus musculus mitochondrion, complete genome
11 NM_010863	17912	Myo1b	myosin 1b
11 NM_010087	13434	Dnm2	DNA methyltransferase 2
11 NM_009102	20132	Rrh	retinal pigment epithelium derived rhodopsin homolog
11 NM_011153	19051	Gsb3	G substrate
11 AK015993	75156		RIKEN cDNA 4930539A05 gene
11 X98456			M. musculus ORF 1 and ORF 2 genes
11 AK006679			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700041N15 product:CHEMOKINE-LIKE FACTOR 2 VARIANT 2
11 AB035322	108897	Pola1	hypothetical protein FLJ12783 (Homo sapiens) 96 %
11 NM_009892	18968	Hira	polymerase (DNA directed), alpha 1
11 X92590	15260	Csf3	hira protein w40 repeat protein
11 NM_009971	12985		colony stimulating factor 3 (granulocyte)
11 NM_033565	93736	Lal4i	lymphoid nuclear protein related to AF4-like [Mus musculus] 100 %

FIGURE 10-11

Cluster Access	Locus	Gene	Description
11 NM_008307	57316	C1d	small unique nuclear receptor co-repressor sun-csr corepressor for hormone receptors c1d; dna-binding protein c1d
11 NM_020558	66917	Chordc1	cysteine and histidine-rich domain (CHORD)-containing, zinc-binding protein 1
11 NM_025844	15394	Hoxa1	homeo box a1 hoxa1
11 NM_010449	15394	Hoxa1	adult male kidney riken cDNA clone:0610030a17; hepsin hpn
11 NM_008281	15451	Hpn	muscleblind-like (Drosophila)
11 NM_020007	56758	Mbnl	adult male brain riken cDNA clone:0710001m07; 1110002a15 clone mbc:11574
11 BC005693	94353	Hnnp3	potassium voltage gated channel shaker related subfamily member 2
11 NM_016909	16490	Kcna2	RIKEN cDNA 2410007P03 gene
11 NM_008417	66296	Epc1	enhancer of polycomb homolog 1 (Drosophila)
11 AK017056	13831	Epc1	DD17_HUMAN Probable RNA-dependent helicase p72 (DEAD-box protein p72) (DEAD-box protein 17) 49 % /
11 AK017858	74351	Gli5	kruppel-like zinc finger protein gli52 related to gli subfamily; gli-kruppel zinc-finger nrl mmi transcription factor
11 NM_031184	83396	Gli5	adult male small intestine riken cDNA clone:2010107d16; 10 11 days embryo clone:2810032c18
11 NM_024187	108121	U2af1	cyclin-dependent kinase-like 2 (CDC2-related kinase)
11 NM_016912	53886	Cdkn2	chaperone, ABC1 activity of bcl complex like
11 NM_028188	67426	Cabc1	transmembrane 4 superfamily member 1
11 NM_023341	17112	Tmeds1	ubiquitin specific protease 29
11 NM_008536	57775	Usp29	
11 NM_021323			
11 AK016639			
11 NM_019487			
11 NM_026111	67369		hypothetical protein FLJ20084 (83% human)
11 AK011187	67420		Similar to hypothetical protein FLJ10462 [58% Homo sapiens]
11 NM_008448	16573	Klf5b	kinesin family member 5B
11 AK002734	74091	Npl	N-acetylneuraminic pyruvate lyase
11 BC005503	192169		RIKEN cDNA 1810047C23 gene
11 BC005711			WD repeat domain 5B (Homo sapiens) 31 % /
11 AK016977	71227		RIKEN cDNA 2310005C01 gene
11 AK009163	76730		lck-related transcription factor foxo3 (foxo3/foxo3b/foxo1/2)
11 NM_015758	30823	Foxe3	14S9_MOUSE TRANSMEMBRANE 4 SUPERFAMILY, MEMBER 8 (TETRASPANIN 5) (TSPAN-5) 100 %
11 NM_019571	56224	Tmeds9	cofactor required for Ss1 transcriptional activation subunit 2 (150 kDa) [69.57% Mus musculus]
11 AK017931	74753		24-dehydrocholesterol reductase
11 NM_053272	74754	Dhcr24	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921520P21 product:hypothetical Microbodies C-terminal targeting signal containing protein
11 AK014934	70887		RIKEN cDNA 2410127L17 gene
11 AK010784	67383		prolactin-like protein C 1
11 NM_011167	19112	Prlpc1	senum/glucocorticoid regulated kinase 2
11 NM_013731	27219	Sgk2	lactylalbin 1
11 NM_009311	21333	Tact1	RIKEN cDNA 1500001L15 gene
11 AK005098	68966		
11 AK015078			
11 NM_019670	56419	Diap3	DIA3_MOUSE Diaphanous protein homolog 3 (Diaphanous-related form 3) (DRF3) (mDIA2) (p134mDIA2) 100 %
11 NM_011231			
11 NM_009861	12540	Cdc42	cell division cycle 42 homolog (S. cerevisiae)
11 NM_011364	20400	Sh2d1b	SH2 domain protein 1A
11 NM_018851	56045	Sarrhd1	SAM domain and HD domain, 1
11 NM_016915	53357	Pla2g6	phospholipase A2, group VI
11 AK005033	52432		DNA segment, Chr 7, ERATO Dot 753, expressed
11 NM_007860	13370	Dio1	adult male kidney riken cDNA clone:0610011120; deiodinase iodothyronine type I dio1
11 BC003288			
11 NM_019689			
11 NM_011360	20392	Sgca	epsilon-sarcoglycan alternative splice product alpha-sarcoglycan
11 BC002171			
11 AK012711			
11 AK012394	114896	Alg3l1	AFG3(ATPase family gene 3)-like 1 (yeast)
11 NM_025461	66272		hypothetical protein LOC51241 (Homo sapiens) 84 %
12 NM_013933	30960	Vapa	vesicle-associated membrane protein, associated protein A
12 NM_007838	13700	Ddost	dolichyl-di-phosphooligosaccharide-protein glycosyltransferase ddot
12 AF061744	23880	Frb	lys binding protein Yb-130
12 AF156545	11982	Alp10a	ATPase, class V, type 10A
12 AK010021	78820		RIKEN cDNA 2410157M17 gene
12 NM_034448	72819		RIKEN cDNA 2810467F15 gene
12 NM_013747	27277	Golga5	golgi autoantigen, golgin subfamily a, 5 [Mus musculus] 100 %

FIGURE 10-12

Cluster Access	Locus	Gene	Description
12 NM_019790	56363	Tnfrif2	transmembrane protein with EGF-like and two follistatin-like domains 2
12 NM_023397	67881	shrm	magnesium-dependent phosphatase-1 [Mus musculus] 100 % RIKEN cDNA 1810034K20 gene
12 NM_015756	27428	shrm	shroom
12 AK007552	56036	Con2	cyclin L2
12 AK011545	70024		Similar to MCM10 minichromosome maintenance deficient 10 (S. cerevisiae) [81% Homo sapiens]
12 BC004801	15220	Foxq1	fork head transcription factor hfh-11 member of hnf-3/fork family; hfh1
12 NM_008239	71517		esophageal cancer associated protein [Homo sapiens] 92 %
12 AK011615	70894		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921510J17 product:hypothetical EF-hand containing protein
12 AK014861	66717		RIKEN cDNA 492151JE08 [Mus musculus] 100 %
12 NM_025725	26943	Tde1	membrane protein Ura-1
12 NM_012032	66471	Cla3	mfnep-1 lnc-like protein leucine rich acidic; 10 11 days embryo riken cDNA clone:2810018a15
12 NM_023210			RIKEN cDNA 493056SC04 gene
12 AK021050	75273		
12 NM_029231			
12 AK021021			
12 AK009634			
12 NM_021524			
12 NM_024480			
12 AK002842			
12 AK013518	14176	Fgf5	fibroblast growth factor-5 [fgf-5] dna exon
12 NM_010203	80794	Cb1c	adult male tongue riken cDNA clone:231007819; castles b-lineage lymphoma c cb1c
12 NM_023224	28464	Vmn3	varin 3
12 NM_011979	52815		DNA segment, Chr 11, ERATO Dsl 530, expressed
12 BC003922	78283		ref.NP_116187.1 - hypothetical protein FLJ14503 [Homo sapiens] 71.76 %
12 AK019929	22415	Wnt3	wingless-related MMTV integration site 3
12 NM_009521	20467	Sin3b	transcriptional regulator, SIN3B
12 L39622	22526	Xmr	Xir-related, meiosis regulated
12 NM_009529	16846	Lep	leptin
12 NM_008493			
12 AK002767			
12 BC009151	26549	Igfbp2	integrin beta 1 binding protein 2
12 NM_013712	50762	Fbxo6b	F-box only protein 6b
12 NM_015797	14357	Dux1	delix1
12 NM_008052	56014	Olfir70	olfactory receptor 70
12 NM_019485	18701	Pigf	phosphatidylinositol glycan, class F
12 NM_008838	13849	Ephr1	epoxide hydrolase 1, microsomal
12 NM_010145	68939		hypothetical protein MGC2827 [94% Homo sapiens]
12 BC008101	67579		RIKEN cDNA 4930447D24 [Mus musculus]
12 NM_026252	17064	C1qr1	complement component 1, q subcomponent, receptor 1
12 NM_010740	21981	Trs	lensin
12 NM_027884	66249		RIKEN cDNA 1810033N24 gene
12 NM_025443	20867	Slp1	stress-induced phosphoprotein 1
12 NM_016737	18630	Pel2	plasmatyoma expressed transcript 2
12 NM_008821	19223	Pigs	prostaglandin 12 prostacyclin synthase pigs
12 NM_008968			
12 NM_025331	16579	Klfp3	kap3a kap3b is its splice variant with a bp insertion containing stop codon.
12 D50366	73830		muscle specific gene [Homo sapiens] 98 %
12 AK004664	56184	Msm1	pMesogenin 1; mesogenin [Mus musculus] 100 %
12 NM_019544	73181	Nalc4	nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 4
12 NM_023659	75547		RIKEN cDNA 1700026G02 gene
12 AK006382	19184	Psrc5	protease (prosome, masopain) 28S subunit, ATPase 5
12 NM_008950	53324	Npt2	neuronal pentacin 2 npt2; npt
12 NM_016789	83434	Rsh1	radial spokehead-1 protein rsh1
12 NM_031255	11907	Ale1	arginine-tna-protein transferase ale1
12 NM_013799			
12 NM_026639			
12 AK018698			
12 NM_018798	16365	Irg1	immunoresponsive gene 1
12 L38281			
12 AK013145	69150	Snx4	soring nexin 4 [Mus musculus] 100 %
12 NM_080557			

Figure 10-13

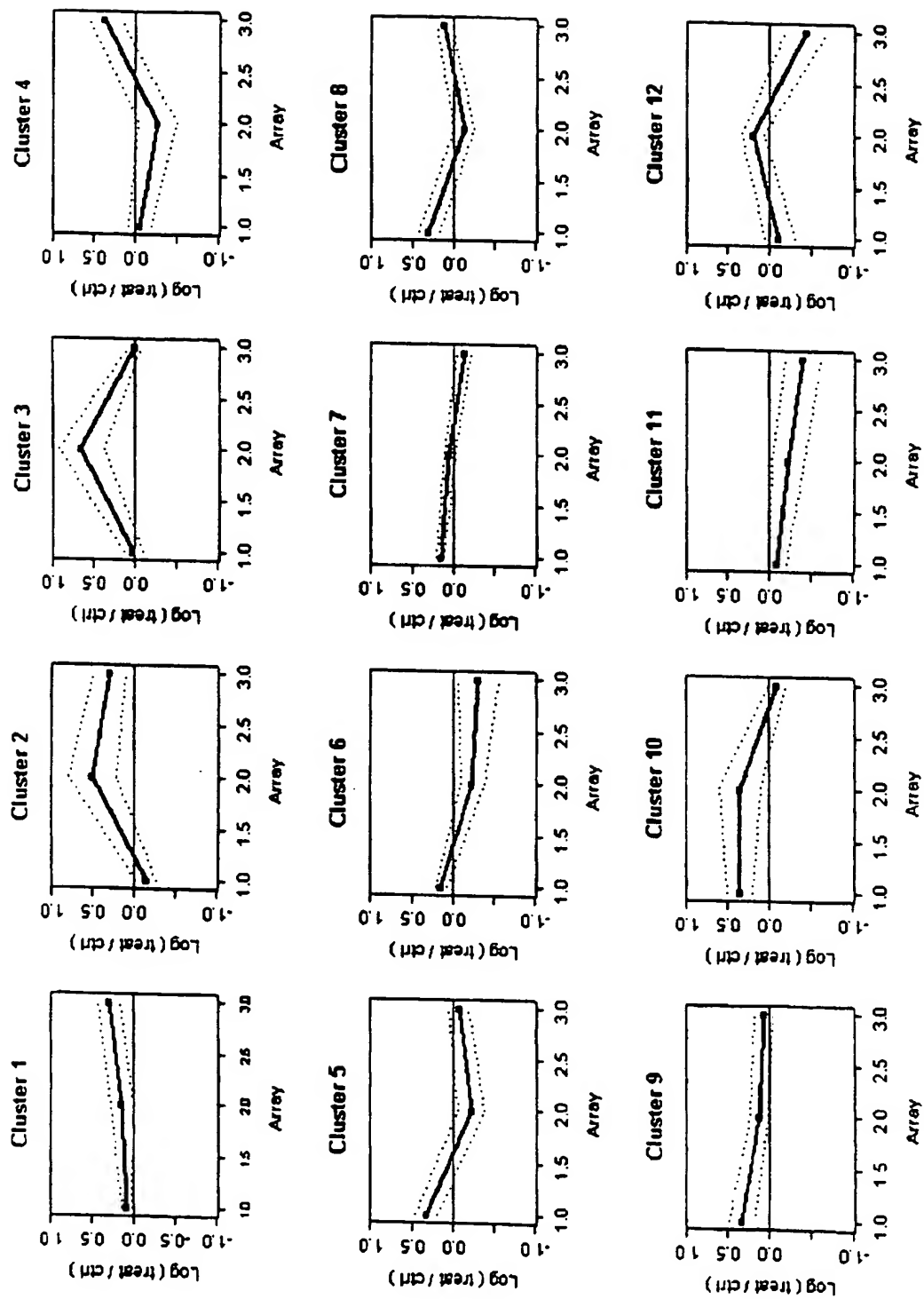


FIGURE 11-1

Cluster	Access	Locus	Gene	Description
1	NM_080450	118448	Gje1	gap junction membrane channel protein epsilon 1
1	NM_026329	87710	Polr2g	polymerase (RNA) II (DNA directed) polypeptide G
1	AF153440	68010	Bambl	10 days embryo riken cdna clone:2610003b06; rna novel transmembrane protein
1	NM_020570	57434	Xrcc2	X-ray repair complementing defective repair in Chinese hamster cells 2
1	NM_018476	26849	Ohr159	lymphocyte receptor 159
1	NM_010736	17000	Llbr	lymphotoxin b receptor
1	NM_008141	14888	Gnat2	guanine nucleotide binding protein alpha transducing 2 gnat2; adult male tongue riken cdna clone:2310016g23
1	AF183608	20658	Son	Son cell proliferation protein
1	AK010358	23853	Del6	differentially expressed in FDCP 6
1	NM_009148	20321	Sdrf2	stromal cell derived factor receptor 2
1	NM_021457	14382	Fzd1	fizzled-1
1	NM_008733	17175	Nrap	nebulin-related anchoring protein
1	NM_018825	56408	Ncoa6	nuclear receptor coactivator 6
1	BC013623	70575		hypothetical protein MGC11335(95% human)
1	Y19185	26875	Pc1o	piccolo (presynaptic cytomatrix protein)
1	AF220135	56631	Trim17	inipartite motif protein 17
1	NM_008306	15531	Nds1	N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 1
1	AK008679	76579		RIKEN cDNA 2210008N01 gene
1	NM_016769	17127	Madh3	mad homolog 3 drosophila madh3; msmd3
1	AK015371	74886		RIKEN cDNA 4930443G12 gene
1	AK015982	75220		Similar to Rag C protein [94% Homo sapiens]
1	D26157	19222	Ptgr	prostaticin receptor
1	NM_019725	21886	Tie2	transducin-like enhancer of split 2, homolog of Drosophila E(spl)
1	NM_032002	83981	Nrp4	neuregulin 4 nrp4
1	AK016775	86765		Similar to myeloid/lymphoid or mixed-lineage leukemia 2 (41% Human)
1	AF282291	258811	MOR171-1	olfactory receptor MOR171-8
1	BC002299	105017		T46427 hypothetical protein DKFZp434G0825.1 (38% human)
1	NM_008958	19207	Pich2	patched homolog 2
1	AK020915	87245	Peli1	pellino 1-refNP_075813.1 - pellino 1; RIKEN cDNA 2810468L03 gene [Mus musculus] 100 %
1	NM_013681	20965	Syn2	synapsin II
2	AF117340	26401	Map3k1	mitogen activated protein kinase kinase kinase 1
2	AK011064	70235		DKFZP434C245 protein [Homo sapiens] 80 %
2	NM_013666	29813	Zfp385	zinc finger protein 385
2	AK017228	75734		GL004 protein [Homo sapiens] 85 %
2	NM_011942	26394	Lyp1a2	lysophospholipase 2
2	NM_054087	116914	Sic19a2	(thiamine transporter thr-1 protein
2	AK012075	72145	Wdy3	WD repeat and FYVE domain containing 3
2	NM_020574	57442	Kcne3	potassium voltage-gated channel, Isk-related subfamily, gene 3; minK-related peptide 2 [Mus musculus] 100 % /
2	NM_025540	66402	Sin	sarcoplasm
2	NM_011184	19167	Pima3	proteasome (prosome, macropain) subunit, alpha type 3
2	AK005035	71775		A28438 lactoferrin precursor - mouse
2	AK014811	75801		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4821504I02 product:hypothetical Serine-rich region containing protein
2	NM_011505	20913	Stabp4	stathmin binding protein 4
2	NM_024248	71813		RIKEN cDNA 2310042N02 gene
2	NM_026813	68201		hypothetical protein MGC14627 (85% human)
2	AK014752	75768		Mus musculus 0 day neonate head cDNA, RIKEN full-length enriched library, clone:48334Z22M21 product:hypothetical protein
2	AF213391	27417	Abcb8	17 days embryo head riken cdna clone:3222401p09; atp-binding cassette protein abcb8
2	NM_013788	27412	Pog12	patently expressed 12
2	AK016681	74057		RIKEN cDNA 4933405D12 gene
2	AK016187	75303		RIKEN cDNA 4930562A09 gene
2	AK021336	78723		RIKEN cDNA D530049N12 gene
2	NM_010128	13730	Ermp1	epithelial membrane protein-1
3	AK005098	70364	Pxp	peroxisomal protein
3	AK016780	71135		RIKEN cDNA 4933411O13 gene
3	NM_013706	23833	Cd52	CD52 antigen
3	NM_013554	15430	Hoxd10	homeo box D10
3	AK016859	71156		RU2A_HUMAN U2 small nuclear ribonucleoprotein A (U2 snRNP-A) 32 %

FIGURE 11-2

Cluster	Access	Locus	Gene	Description
3	AK005726	67848		adult male testis riken cdna clone:1700007J23; clone:4930522h14
3	NM_033652	110848	Lmx1a	lim homeodomain-containing transcription factor (mx1a)
3	NM_030611	83702	Akr1c6	Akr1c6
3	NM_009141	20311	Cxd5	chemokine (C-X-C motif) ligand 5
3	BC004064	20682	Sor9	SRY-box containing gene 9
3	AK017105	71283		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933438A12 product:undclassifiable
3	NM_025494	66335	Alp6v1c1	ATPase, H+ transporting, V1 subunit C, isoform 1
3	AK016420	74053	Grip1	glutamate receptor interacting protein 1
3	NM_007657	12527	Cd9	CD9 antigen
3	NM_021406	58217	Trem1	triggering receptor expressed on myeloid cells 1
3	AK020739			procollagen, type VI, alpha 3
4	BC005491	12835	Col8a3	fibroblast activation protein
4	NM_007986	14089	Fap	Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
4	AK010800	70797		methylenic aciduria (cobalamin deficiency) type B homolog (human)
4	AK020286	77697	Mmab	RIKEN cDNA 6330583M11 gene
4	NM_024465	76192		FXRD domain-containing ion transport regulator 7
4	NM_022007	57780	Ixyd7	RIKEN cDNA 1700120K04 [Mus musculus]
4	NM_026628	68232		hypothetical protein MGC11275, likely ortholog of mouse syndesmos [95% Homo sapiens]
4	NM_025839	66911		RIKEN cDNA 2410193C02 gene
5	AK010834	78775		interleukin 17B receptor
5	NM_0189583	50905	Il17br	RIKEN cDNA 1110068E08 gene
5	AK010471	68876		RIKEN cDNA 4831405B09 gene
5	AK015929	70939		RIKEN cDNA 3732407C23 gene
5	AK014404	74014		cydin-dependent kinase 5
5	NM_007668	12568	Col5	hypothetical protein PT004; homologous yeast-44.2 protein [98% Homo sapiens]
5	AK013055	67059		CDC42 effector protein (rho GTPase binding) 5
5	NM_021454	58804	Cdc42ep5	zinc finger protein 316; kruppel-related zinc finger protein [Mus musculus] 100 %
5	NM_017467	54201	Zfp316	uromodulin
5	BC012973	22242	Uromod	alpha-methylacyl-CoA racemase
5	NM_008537	17117	Anacr	Similar to hypothetical protein FLJ10242 [95% Homo sapiens]
5	AK010577	78599		sulfatase 2
5	AK008108	72043	Sulf2	RIKEN cDNA C630050I24 gene
5	AK021281	78571		eukaryotic translation initiation factor 3, subunit 4 (delta)
5	NM_016878	53356	Elf3s4	cytotoxic T-lymphocyte-associated protein 4
5	NM_009843	12477	Cla4	Mus musculus 0 day neonate head cDNA, RIKEN full-length enriched library, clone:4833444C15 product:hypothetical protein
5	AK019526	78801		SET translocation [Mus musculus] 100 %
5	NM_023871	56086	Set	hypothetical protein, P4(21) in gene
5	AB028868	58363	AJ242955	WNT1 inducible signaling pathway protein 1
5	NM_018865	22402	Wisp1	gene trap locus 3
5	AK011217	14894	G03	stimulated by retinoic acid 13
5	NM_016685	20892	Stra13	Interferon-gamma (multi-gamma)
5	K00083	15878	Iifg	A kinase (PRKA) anchor protein 8
5	NM_019774	56399	Akap8	N-acetyl galactosaminidase, alpha
5	NM_008669	17839	Naga	aldehyde dehydrogenase 2
6	NM_018811	54608	Abhd2	5-hydroxytryptamine (serotonin) receptor 1B
6	NM_010482	15551	Htr1b	Integral membrane protein 2A
6	NM_008409	16431	Iim2a	IRNA selenocysteine associated protein [Homo sapiens] 88.64 %
6	AK003534	71787		cortactin associated protein-like 2
6	NM_025771	68797	Ctrnp2	RIKEN cDNA 230000Z018 gene
6	AK009014	69341		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930557G23 product:homeodomain interacting protein kinase 1
6	AK016162			zuo1in related factor 2
6	NM_009584	22792	Zrf2	ADP-ribosylation-like factor 6 interacting protein
6	AF223953	54208	Atf6ip	CERU_MOUSE CERULOPLASMIN PRECURSOR (FERROXIDASE) (98% Mus musculus)
6	AK015642	75036		carbonic anhydrase 6
6	NM_009802	12353	Car6	18 days embryo riken cdna clone:1110032018
6	AK004043	68742		COP9 (constitutive photomorphogenic) homolog, subunit 3 (Arabidopsis thaliana)
6	NM_011891	26572	Cops3	

FIGURE 11-3

Cluster	Access	Locus	Gene	Description
6	Y12229	22268	Utrn	utrophin
6	NM_011874	23996	Psmc4	proteasome (prosome, macropain) 26S subunit, ATPase, 4
6	NM_012061	27062	Cadps	Ca 2+-dependent activator protein for secretion
6	NM_008106	14539	Opn1mw	opsin 1 (cone pigments), medium-wave-sensitive (color blindness, deutan)
6	NM_026580	68149		ubiquitin-specific protease otubain 2 (94%)
6	NM_007674	12592	Cdx4	caudal type homeo box cdx4
6	NM_010094	13590	Ebat	endothelial bleeding associated factor
6	NM_009042	19692	Reg1	regenerating islet-derived 1
6	AK013984	73112		Mus musculus 13 days embryo head cDNA, RIKEN full-length enriched library, clone:3110003A17 product:unknown EST
6	NM_013650	20201	S100a8	S100 calcium binding protein A8 (calgranulin A)
6	NM_009881	12593	Cdy1	chromodomain protein, Y chromosome-like
6	AJ245739	14683	Gnas	GNAS (guanine nucleotide binding protein, alpha stimulating) complex locus
6	NM_023162	66136		RIKEN cDNA 1110014N07 gene, nuclear RNA polymerase I small specific subunit [Mus musculus] 100 %
6	NM_008098	14489	Mipn	myotrophin
6	NM_013722	27204	Syn3	synapsin 3
6	NM_019642	20014	Rpn2	ribophorin II
6	NM_009234	20666	Sox11	SRY-box containing gene 11
7	AF220644	54646		protein phosphatase 1, regulatory (inhibitor) subunit 3F [83% Homo sapiens]
7	AK006977	76614	Irmt	inner membrane protein, mitochondrial
7	NM_023537	69908	Rab3b	RAB3B, member RAS oncogene family
7	NM_018745	54375	Oaz3n	ornithine decarboxylase antizyme inhibitor
7	AK005748	69351		RIKEN cDNA 1700008A04 gene
7	NM_009639	11572	Aeg2	acidic ephedrymal glycoprotein 2
7	NM_008703	18101	Ninbr	neuromedin B receptor
7	AK002491			Mus musculus adult male kidney cDNA
7	NM_007770	12951	Crx	homeodomain protein crx homeobox
7	AK016810	71138		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4833413N12 product:undclassifiable
7	BC005702	68385		Mus musculus RIKEN cDNA 0610030G03 gene, mRNA (cDNA clone MGC:11893 IMAGE:3598444), complete cds
7	NM_008644	17830	Muc10	mucin 10, submandibular gland salivary mucin
7	AK018466	70965		plectatrin and Sec7 domain protein [56% Homo sapiens]
7	AK018015	17900		hypothetical protein FLJ11273 [94% Homo sapiens]
7	NM_008902	19011	Pp11r	placental protein 11 related
7	BC012878	77034		Proline-rich protein MP-3 (29% Mus musculus)
7	AK010429	71956		Z147_MOUSE Zinc finger protein 147 (Estrogen responsive finger protein) (Efp) 32 %
7	NM_020045	56748	Hirp5	Histone cell cycle regulation defective interacting protein 5
8	NM_080638	78388	Mvp	major vault protein
8	NM_011054	18575	Pde1c	phosphodiesterase 1C
8	NM_027170	69696		JC6547 high sulfur protein B2E - rat 37 %
8	NM_026309	67678		LSM3_HUMAN U6 snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
8	NM_025316	66046	Ndufb5	NADH dehydrogenase (ubiquinone) 1 beta subcomplex
8	AF156490	14405	Gabrg1	gamma-aminobutyric acid (GABA-A) receptor, subunit gamma 1
8	NM_007574	12262	C1qg	complement component 1, q subcomponent, gamma polypeptide
8	NM_009757	12155	Bmp15	growth differentiation factor-8b gdf-8b; bone morphogenetic protein 15 bmp15
8	NM_023517	69583	Tnfrsf13	tumor necrosis factor (ligand) superfamily, member 13
8	AK004076	68038		HSPC038 protein [Homo sapiens] 100 %
8	NM_011870	23991	C1b1	calcium and integrin binding 1 (calmyrin)
8	NM_009838	12466	Cct8a	chaperonin subunit 8a (zeta)
8	NM_010909	18038	Nkx1a1	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
8	NM_025816	52440	DeEd77z	Tax1 (human T-cell leukemia virus type I) binding protein 1; tax-1 binding protein [Homo sapiens] 80 %
8	NM_026031	67205	Cgla4	CGI-94 protein
8	AK012684	69922	Vrk2	vaccinia related kinase 2
8	NM_007507	11958	Alp5k	atp synthase h+ transporting mitochondrial f1f0 complex subunit e atp5k; lhm-1 f1f0-atpase
8	NM_008060	19733	Rgn	regucalcin
8	NM_020606	57342	Parva	parvin, alpha
8	AK011897	72495		RIKEN cDNA 2810206C17 gene
8	NM_010671	16689	Krtap13	keratin associated protein 13
8	AK012535	101513		expressed sequence AIZ56456

FIGURE 11-4

Cluster	Access	Locus	Gene	Description
8	AK004854	71709		similar to A49307 88K GTPase-activating protein ABR, brain - human 29 %
8	AK009387	69578		RIKEN cDNA 2310016G11 gene
8	AF448804	72162	Ddx36	
8	NM_013818	18368	Ohp67	olfactory receptor 87
8	NM_011658	22160	Twist1	twist gene homolog 1 (Drosophila)
8	NM_019865	58709	Dnajb12	mdj10 deduced amino acid sequence of is homologous to c. elegans putative dnaj protein z73102 b0035.14, homolog
8	NM_023175	52633		NH protein 2 [89% Homo sapiens]
8	NM_023788	75825		RIKEN cDNA 2010107K23 gene
8	X58472	16588	Kin	antigenic determinant of rec-A protein
8	NM_053011	94217	Up1b	low density lipoprotein-related protein 1B (deleted in tumors)
8	NM_013454	11303	Abca1	ATP-binding cassette, sub-family A (ABC-1), member 1
9	AK017569	74737		RIKEN cDNA 5730417B17 gene
9	AY029613	70359	Gripb3	GTP binding protein 3
9	NM_009255	20720	Serpine2	serine (or cysteine) proteinase inhibitor, clade E, member 2
9	AK007667	69171		
9	AK010878	66628		Similar to hypothetical protein FLJ20548 [82% Homo sapiens]
9	NM_028120	72140		RIKEN cDNA 2810507L03 [Mus musculus] 100 %
9	AK004552	71712		Similar to hypothetical protein FLJ11259 [Homo sapiens] 93 %
9	AK005811	75485		
9	AK005668	69297		Similar to hypothetical protein MGC16309 [Homo sapiens] 70 %
9	NM_021481	58866	Treh	trehalase (brush-border membrane glycoprotein)
9	NM_007734	12828	Col4a3	alpha collagen iv col4a3
9	NM_007768	12844	Crp	C-reactive protein, peltasin related
9	NM_010223	14232	Fkbp8	FK506 binding protein 8
9	NM_008687	17938	Nab1	Ngf-A binding protein 1
9	NM_013652	20303	Ccl4	chemokine (C-C motif) ligand 4
9	AK021160	77478		Mus musculus adult male corpus ciliatum cDNA, RIKEN full-length enriched library, clone:C030048J01 product: hypothetical protein
9	AF343752	77053	Unc84a	unc-84 homolog A (C. elegans)
9	NM_011856	23964	Ozd2	odd Ozten-m homolog 2 (Drosophila)
9	NM_028189	72297	Bgnl3	UDP-GlcNAc:beta-Gal beta-1,3-N-acetylglucosaminyltransferase 3
9	AK009749	69654		DYNC_HUMAN Dynein complex 50 kDa subunit (50 kDa dynein-associated polypeptide) (Dynamitin) (DCTN- 94 %
9	NM_008550	17160	Man2b2	mannosidase 2, alpha B2
9	AK014702	74589		Similar to KHL1_MOUSE Kelch-like protein 1 30%
9	NM_009763	12182	Bst1	bone marrow stromal cell antigen 1
9	AK017382	75738		BCL2-like 12 (proline rich), Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
10	NM_020505	57257	Vav3	vav 3 oncogene
10	AK016520	71745	Cu12	culin 2
10	NM_021339	57810	Cdon	oncogene-regulated cell adhesion molecule orcam
10	NM_007549	12143	Blk	B lymphoid kinase
10	NM_008477	18709	Kln1	kinectin 1
10	AK004824	67528	Nudt17	nudix (nucleoside diphosphate linked moiety X)-type motif 7
10	NM_011919	26356	Ing1	inhibitor of growth family, member 1
10	NM_030735	81010	V3R9	phenomone receptor V3R9
10	AK006201	57755	Dnajb7	DnaJ (Hsp40) homolog, subfamily B, member 7
10	AK004138	68732		hypothetical protein FLJ20048 [Homo sapiens] 78 %
10	NM_008537	22632	Yy1	YY1 transcription factor
10	NM_019633	58279		hypothetical protein 1-92 [100% Mus musculus]
10	NM_011898	24063	Spry1	sprouty homolog 1 (Drosophila)
10	NM_028218	72381		2118399A elongin B [Homo sapiens] 72 %
10	BC018456	69459		RIKEN cDNA 2300004C15 gene
10	NM_011855	23963	Odz1	odd Ozten-m homolog 1 (Drosophila)
10	AK020300	78240	Csl11	ref NP_543020.2 - cystatin 11, isoform 2 precursor; cystatin-related epididymal-specific protein; SC13delta [Homo sap 37 %
10	NM_008889	18992	Pou3f2	POU domain, class 3, transcription factor 2
10	NM_033564	93734	Mpv17	Mpv17 transgene, kidney disease mutant-like
10	AK017767	66653	Brf2	BRF2, subunit of RNA polymerase III transcription initiation factor, BRF 1-like
10	AF278974	192201		RIKEN cDNA 9230106L14 gene
10	NM_011462	20729	Spin	spindlin

FIGURE 11-5

Cluster	Access	Locus	Gene	Description
11	AK018148	70729	Capon	C-terminal PDZ domain ligand of neuronal nitric oxide synthase
11	AK016707	74420		RIKEN cDNA 4933406P04 gene
11	NM_009237	20675	Sox3	SRY-box containing gene 3
11	AK004139	68735		mitochondrial ribosomal protein S18C; CGI-134 protein; mitochondrial ribosomal protein S18-1 [Homo 78 %]
11	NM_016733	12371	Casp9	caspase 9
11	NM_021310	57748	Jmy	junction-mediating and regulatory protein
11	BC006048	14194	Fh1	turnip root necrotic virus 1
11	NM_025310	56095	Epc3	ectoplacental cone, invasive trophoblast giant cells, extraembryonic ectoderm and chorion sequences 3
11	NM_020578	57440	Ehd3	EH-domain containing 3
11	AF233560	107392	Brrs1	breast cancer metastasis-suppressor 1
11	NM_011622	21968	Tom1	target of myb1 homolog (chicken)
11	NM_011783	23795	Agf2	anterior gradient 2 (Xenopus laevis)
11	AK019095	78887		similar to pR-T00322 - T00322 hypothetical protein KIA0542 - human 82 %
11	AK004934	71774		similar to APXL_HUMAN Apical-like protein (APXL protein) huma 28 %
12	AK009086	69533		similar to keralin associated protein 4.7 [31% Homo sapiens]
12	NM_023266	104348	Zfp120	zinc finger protein 120
12	AK018444	52504		expressed sequence A1448222
12	NM_013483	12231	Bin1a1	butyrophilin, subfamily 1, member A1
12	AK006472	74239		Rab8-interacting protein 2 [Mus musculus] 23.36 %
12	NM_008348	16154	Il10ra	Interleukin-10 receptor alpha
12	AJ297743	30934	Tor1b	torsin family 1, member B
12	AK017387	71363		RIKEN cDNA 5430433J05 gene
12	NM_010351	14836	Gsc	goosecoid gene
12	AF358257	70987		T46811 CL288 protein - rat (3.1 % R.norvegicus)
12	NM_053168	94091	Trim11	tripartite motif protein trim11
12	AK015385	74673		RIKEN cDNA 4830451F05 gene
12	AK012063	67181	Dullard	Dullard homolog (Xenopus laevis)
12	AK007540	69769		hypothetical protein FLJ23467 [Homo sapiens] 93 %
12	NM_025554			zinc finger protein 108
12	AF060246	22647	Zfp106	CA00_HUMAN Protein CGI-100 precursor (89% human)
12	AK014490	73130		Similar to nuclear prelamin A recognition factor, isoform a [84% Homo sapiens]
12	AK013432	67608		Mus musculus 10 days embryo whole body cDNA, RIKEN
12	AK011324			Eaf1 protein
12	AK016628	74427	Eaf1	hepatocyte growth factor
12	X772307	15234	Hgf	ARP8 actin-related protein 6 homolog (yeast)
12	AK008409	67019	Actr6	ring finger protein 17
12	AF285585	30054	Rnf17	adult male small intestine riken cDNA clone:2010005f18
12	AK008125	69831		frequent homolog (Drosophila)
12	NM_019681	14269	Freq	Nuclear neuronal protein 15.8
12	NM_019435	104130	Np15	upregulated in colorectal cancer gene 1
12	NM_053192	94228	Ucc1	spinocerebellar ataxia 2 homolog (human)
12	NM_009125	20239	Scs2	achete-scute complex homolog-like 2 (Drosophila)
12	NM_008554	17173	Asd2	perinatal skeletal myosin heavy chain 3 end
12	M12288	17885	Myh8	

Figure 11-6

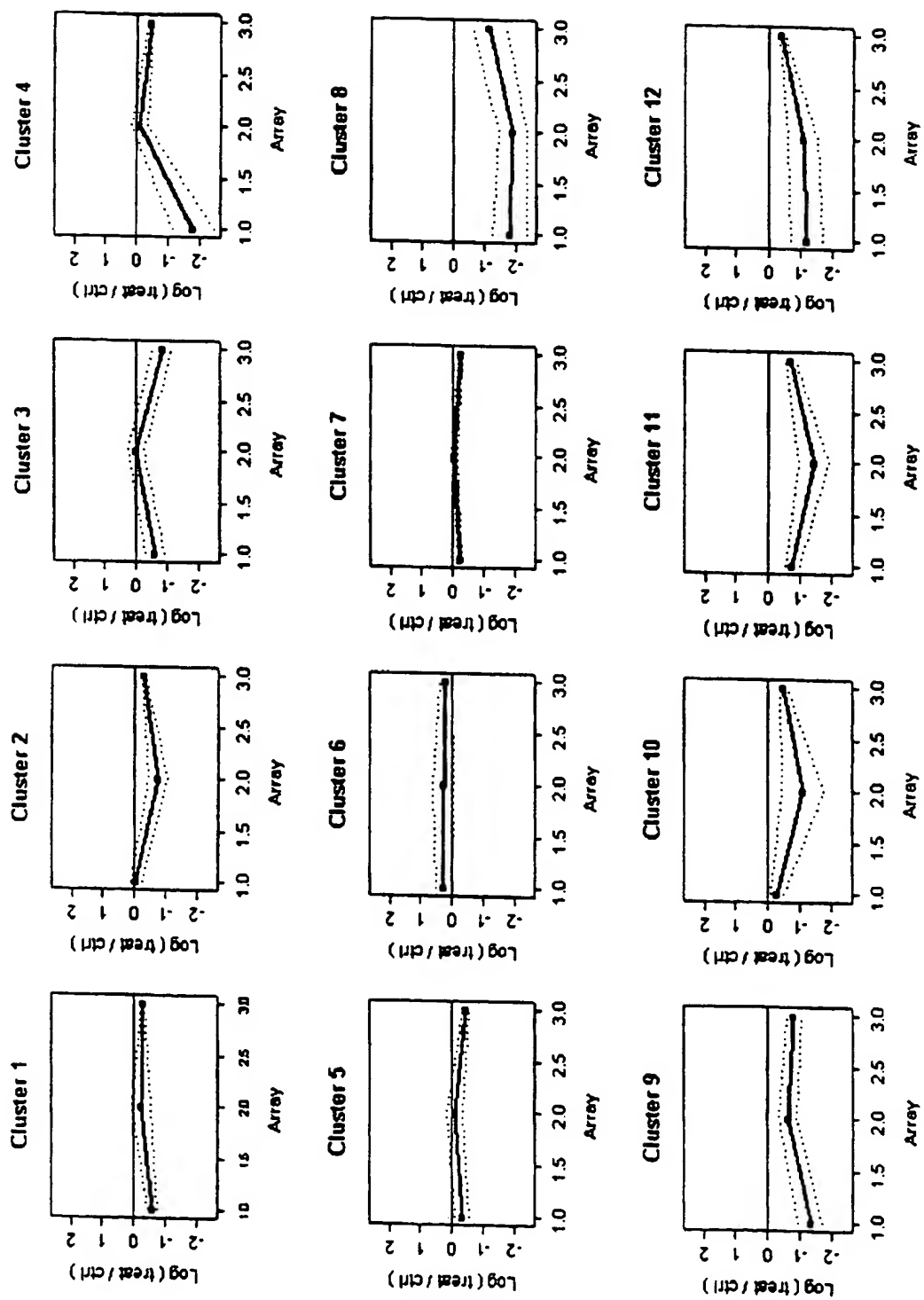


FIGURE 12-1

Cluster	Access	Lenne	Gene	Description
1	NM_008190	15159	MCs	Holocytochrome c synthetase
1	AK008090			
1	AK011495	70361	Lrrn1	lectin, mannose-binding, 1
1	NM_007839	13942	Epha8	Eph receptor A8
1	NM_015787	50762	Frbf8b	F-box only protein 6b
1	NM_028562	76279	Cyp2d26	cytochrome P450, family 2, subfamily d, polypeptide 26
1	NM_011080	18686	Phr1	per-hexamer repeat gene 1
1	NM_008669	17839	Naga	N-acetyl galactosaminidase, alpha
1	AK004864	73830		muscle specific gene [Homo sapiens] 88 %
1	NM_021493			
1	NM_008094	14466	Gba	acid beta glucosidase
1	AK005828			
1	AK008110			
1	AK006554	17830	Muc10	mucin 10, submandibular gland salivary mucin
1	NM_008644	71138		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4833413N12
1	AK010910	16996	Ltbp1	latent tgf beta binding protein ltbp-1
1	NM_019919	14938	Gzma	granzyme A
1	NM_010370			
1	BC006805			
1	AK010366	10328	Imp	intracellular protein
1	NM_025386	27277	Golga5	golgi autoantigen, golgin subfamily a, 5 [Mus musculus] 100 %
1	NM_008393			
1	NM_013747			
1	AK010062	11435	Chna1	muscle nicotinic acetylcholine receptor alpha alpha subunit: alpha-subunit cholinergic
1	NM_007389	11762	Ag4s1	adult male cerebellum riken cDNA clone:1500010617
1	NM_021710			
1	BC025963			
1	AK008081	11482	Acv1	actinin type 1b receptor alk-1 putative, nih swiss
1	NM_009512			
1	BC005624			
1	NM_011879	26484	Vnn3	vnnin 3
1	NM_027334	70162		DKFZ598A0522 protein [Homo sapiens] 83 % / 168 aa
1	NM_007847	12499	Enp65	ectonucleoside triphosphate diphosphorylase 5
1	NM_053201			
1	AK016275	54810	Tbc1d8	TBC1 domain family, member 8
1	NM_018775	78257		hypothetical protein FLJ20156 [Homo sapiens] 28 %
1	AK010545	67971		CG3-39 protein [88% Homo sapiens]
1	NM_026481			
2	AK010381	83436	Plekha2	pleckstrin homology domain-containing, family A (phosphoinositide binding specific) member 2
2	NM_031257	18260	Ocm	2210347C occludin [Mus musculus]
2	NM_008756			
2	AF151110	50530	Mlap5	18 days embryo riken cDNA clone:1110005n14
2	NM_015776			
2	NM_024277			
2	NM_025738			
2	AK012128	17695	Msmb	beta-microseminoprotein, beta-inhibin, prostatic inhibin protein [Mus musculus]
2	NM_020587			
2	AK005345			
2	NM_021600	14534	Gcn52	gcn5 histone acetyltransferase; clone image:3481089
2	NM_020004			
2	AK018766	21428	Tcf4	transcription factor like 4 tcf4
2	NM_011550			
2	AK018531			
2	AK014579			
2	NM_007883	71758		T00335 hypothetical protein KIAA0564 - human (fragment)(89% human)
2	AK004996	76645		RIKEN cDNA 1700126L06 gene
2	AK007293	67358	Cnar	cell matrix adhesion regulator
2	NM_020012	12913	Creb3	cardiorespiratory element binding protein 3 clone nrc-8348; bsp-1 and bsp-2 proteins bind
2	BC002094	56642	Ankrd2	ankyrin repeat domain 2 (broth responsive muscle)
2	NM_020033	66192		carcinoembryonic antigen 1; carcinoembryonic antigen [Homo sapiens] 35 %
2	NM_025410	17222	Mcp	melanocyte cell protein regulator
2	NM_008569	66292	Mps21	mip21 mitochondrial ribosomal protein s21
2	NM_078479	20955	Sytl1	synaptobrevin like 1
2	AJ133536	16339	Kcnk2	k+ voltage-gated channel subfamily a 2 knk2
2	AK016597	71027		adult male testis riken cDNA clone:4833401601
2	NM_008436			
2	AK006386			
2	NM_007515	73763	Phox2a	RIKEN cDNA 4833427G06 gene
2	AK010760	11659		paired-like homeobox 2a
2	NM_008587			
2	AK018621			

FIGURE 12-2

Cluster	Access	Locus	Gene	Description
2	AK011185	72125		Similar to CGHUV collagen alpha 2(V) chain precursor - human 30%
2	NM_028119			
2	NM_019578		Tclap2c	transcription factor ap-2 gamma clone mpc:5982; ap-2.2
2	NM_009335	21420	Fhl1	fragile histidine read gene
2	NM_010210	14108	Mpv17	mpv17
2	NM_008622	17527	Popdc	protein phosphatase 1, catalytic subunit, gamma isoform
2	NM_013636	16047		
2	NM_031173			
2	AK016569			
2	AK005730		Cyp4b	Cytochrome P450, family 4b, subfamily a, polypeptide 1
2	NM_010010	13116		RIKEN cDNA 633057SP11 gene
2	BC004778	233802		RIKEN cDNA 7420700M05 gene
2	AK016361	7573		
2	AK015427			
2	AK015645			
2	NM_010739	17063	Lyd4	lymphocyte antigen 64
2	BC004091	215705		hypothetical protein CLONE24945 (27% human)
2	AK018042			
2	AK004913			
2	BC004027			
2	AK003558			
2	NM_008530	17071	Lyd1	ly-6l.1 neurotoxin homologue exons 1-2
2	NM_009600	11687	Alox15	arachidonate 15-lipoxygenase
2	U56773			
2	AK006105	70927		RIKEN cDNA 5730403B19 [Mus musculus] 59 %
2	NM_009036	10668	Rbpaui	recombinant binding protein suppressor of hairless-like (Drosophila)
2	AK008624	12704	Ct	fibroblast-inhibiting citron kinase crit. cat. mouse binding protein alternatively spliced form
2	AK015163	72163	Shn6	sorting nexin 6
2	NM_053186			
2	AK005041	52575		hypothetical protein FLJ20432 [Homo sapiens]
2	NM_011246			
2	AK016083	75311		Mus musculus cDNA, MGC146499, identical to rat cDNA 483533c14 product/hypothetical 12 cDNA/multi-binding unit
2	AK020580			
2	NM_009129	20254	Ssq2	mouse musculus parval mRNA for s104 protein
2	NM_023742	74188	Dlx2	homeobox protein Dlx2
2	BC013717	225363		10 days embryo riken cDNA clone:281052A408; delta2
2	AK003234			S50853 translation releasing factor eRF-1 (90% human)
2	NM_009474	22862	Uor	urate oxidase ec 1.7.3.3
2	NM_009802	12353	Cnr6	carbonic anhydrase 6
2	NM_011773	22784	Slc30a3	solute carrier family 30 zinc transporter; member slc30a3; znt-3
2	NM_009012			
2	AK009937	71941		hypothetical protein FLJ12118 [77% Homo sapiens]
2	NM_010553			
2	AK013041	69940		Sec3-like, homolog of yeast exocyst protein Sec3p [Homo sapiens] 90 %
2	AK018456	71519	Cyp2u1	Cytochrome P450, family 2, subfamily u, polypeptide
2	AK003876	66581	Timp21	transmembrane trafficking protein
2	NM_008886	18023	Nfe2l1	nrf1 splice variant d bcp protein
2	NM_019859	56379	Kcnj1	potassium inwardly-rectifying channel subfamily J member kcnj1
2	AK004918	66888		insulin receptor tyrosine kinase substrate (90% human)
2	NM_026063	67287		RIKEN cDNA 2600010M23 [Mus musculus] 100 %
2	AK012109			
2	AK010555	69748		RIKEN cDNA 2410019A14 gene
2	AK008838			
2	NM_025850	67072	Cdc37l	11 days embryo riken cDNA clone:2700033a15
2	NM_008951	19165	Psmo4	proteasome (prosome, macropain) 26S subunit, non-ATPase, 4
2	NM_016886			
2	NM_028446	56470	Rgs19b1	riken cDNA 2810042904 clone mpc:8350; 2810042044rt
2	NM_009945	12866	Cor7a3	10 days embryo riken cDNA clone:2610001622; cytochrome c oxidase subunit via 3 cont7a3
2	AK00282			
2	AK016598			
2	NM_011427	20813	Snai1	snail homolog drosophila
2	AK019713	78920		riken cDNA 4630526008 clone mpc:7935
2	AK019591			
2	AK018883	77634	Wzabp	small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]
2	NM_030729	60987	Pais1	n-rasp binding protein with
2	NM_018953	56459		adult male hippocampus riken cDNA clone 200008a-24 full insert death aspcylo-cto-aspcylo bar binding protein dcaep1
2	NM_010113			
2	NM_011505	21859	Timp3	tissue inhibitor of metalloproteinases-3
2	NM_007951			
2	AK020691	170678	Ppa10	potentially expressed 10
2	NM_015814	50781	Dnk3	10 11 days embryo riken cDNA clone:2810409a22; dbdknpl-3 dbk-3

FIGURE 12-3

Cluster	Access	Gene	Gene	Gene	Description
3	NM_010255	14431	Gmrt		guanineacetalate methyltransferase
3	AF389869				
3	AK018688	60297	Spn4		spectrin beta 4
3	AY032655	21981	Tns		tensin
3	NM_027804	105005	Nse1		NSE1
3	BC005488	12814	Cell161		alpha1(I) collagen chain
3	NM_007729	20164	S100a10		calpactin light chain p11
3	NM_009112				
3	AK003179				
3	AK007896				
3	AK005610	71797			chondroitin 4-sulfotransferase [Mus musculus] 47 %
3	AK004401				
3	NM_013547	56638	Scyl28		small inducible cytokine a28 scyl28
3	NM_020278	20321	Sclt2		stromal cell derived factor receptor 2
3	NM_009148				
3	NM_008898				
3	AK020378	77225	Sult-a1		Muscle adult muscle desaminase cDNA, RIKEN full-length enriched library, clone 9230161L09 product hypophosphal sulfotransferase-related protein SULT-A1
3	NM_020564	57429	Ab3		antisense 3
3	NM_007441	11694			
3	AF169908	12530	Cdc25a		cdc25a cdc25m3
3	NM_007659				
3	AK018640	57781	Mox2r		antigen identified by monoclonal antibody MRC OX-2 recepto
3	NM_021375	17354	Mit10		myeloid/lymphoid or mixed lineage-leukemia translocation to homolog otrosophila mit10
3	NM_010804				
3	NM_073850				
3	AK018132	74008			KUAA1001 protein [Homo sapiens] 78 %
3	AK003866	28285			JC4913 anti-sigma cross-reacting protein homolog 1 alpha precursor - 89% human
3	NM_016681	26378	Ahcy		S-adenosylhomocysteine hydrolase
3	AK016868	68646			RIKEN cDNA 1110020G09 gene
3	AK013108	76917			Mus musculus 10, 11 days embryo whole body cDNA, RIKEN full-length enriched library, clone 281041712 product hypothalamic corticotrophin
4	AK006121	14613	Gja5		matrix metalloproteinase 2 mmp2
4	AK006121				slug zinc finger protein bugh chicken; zinc finger
4	NM_006610	17390	Mmp2		adult male testis riken clone 4930570A09
4	NM_011415	20583	Shgh		
4	NM_025423	68206			
4	BC006640				
4	NM_021704	20315	Crd12		chemokine (C-X-C motif) ligand 12, l81182 cytokine - mouse 100 %
4	AK004200	67282			AD16, HUMAN Protein AD-16 (Protein CG-116) (cd0009) 80 % /
4	NM_031391	63602	Gtf2a1		general transcription factor II A, 1
4	NM_028161				
4	NM_025507				
4	L25800				
4	AK013137	13955	Epn2		epsin 2
4	AF057280	12857	Cox4a		mitochondrial cytochrome c oxidase subunit IV cox exons 4 and 5, cox4
4	NM_009941	22214	Ube2h		ubiquitin-conjugating enzyme E2H
4	NM_009459	13731	Emp2		epithelial membrane protein 2
4	AF083870	16434	Itpa		inosine triphosphatase (nucleoside triphosphate pyrophosphatase
4	NM_025922	53895	Cbp		caseinolytic protease, ATP-dependent, proteolytic subunit homolog (E. coli
4	NM_017393	13123	Cyp7b1		10 11 days embryo riken clone 2810407111; cytochrome p450 7b1 cyp7b1
4	NM_007825	13401	Dmr9		dystrophin myotonic linked gene,
4	Z38011	19411	Rarg		retinoid acid receptor gamma intron-gamma-a
4	NM_011244	20911	Srbp2		synatain binding protein 2
4	NM_011503	23960	Oas1g		2'-5' oligoadenylate synthetase 1G
4	BC018470				
4	NM_015759				
4	AK018225				
4	BC003382				
4	AK016981				
4	NM_011070	18837	Ptda2		preludin 2 ptda2
4	BC005613	73373			adult male tongue riken clone 2310074e15
4	AK010147				
4	BC002253				
4	NM_023284	68942			T12468 hypothetical protein DKFZp564O123.1 - human 97 %
4	AK004508	27397	Mpx17		ribosomal protein mitochondrial t26 rmt26
4	NM_025301				
4	NM_060433				
4	NM_007619	12402	Cbl		c-bbl proto-oncogene
4	AK002546	66056			hepatocellular carcinoma-associated antigen 112 [55% Homo sapiens]
4	AK003496	73833			T08873 hypothetical protein DKFZp564F0522.1 human (fragment) 49 %
4	AK004655	74107			hypomelic protein FLJ10540 [Homo sapiens] 79.28 %
4	AK005688				

FIGURE 12-4

Cluster	Access	Locus	Gene	Description
4	AX000994	19035	Pfib	adult male kidney riken cDNA clone 0610009p05
4	NM_011149	73332		MYH3_RAT Myosin heavy chain, fast skeletal muscle, embryonic (22% M. musculus)
4	AK006688	224860	Pic12	phosphatase C-like 2
4	AB033415	71897		RIKEN cDNA 2310010M24 gene
4	AK009282	231841		unknown
4	AF226653	12330	Camt	calretinin
4	NM_007597			
4	Y17345			
4	NM_030566			
4	AK005907			
4	NM_011581	21865	Tdg	thymine DNA glycosylase
4	D50060			
4	NM_010053	13390	Dh11	distal-less homeobox
4	NM_007663	12556	Cdh16	ksp-cadherin cdh18
4	NM_080535	67916	Ppap2b	phosphatidic acid phosphatase type 2B
4	NM_013869			
4	NM_019718			
4	NM_025786			
4	NM_004262			
4	NM_005476			
4	AK021026	23996	Psmc4	proteasome (prosome, macropain) 26S subunit, ATPase, 4
4	L10319	65902		RIKEN cDNA 2410035J10 gene
4	AK020384	77264	Zfp142	RIKEN cDNA B430318H21 gene
4	AK015245	74626		zinc finger protein 142
4	NM_013519	14234	Fouc2	RIKEN cDNA 4930426O20 gene
4	AB037596	14538	Gml2	mesenchyma fork head 1 protein; mfh-1
4	NM_021437			glucosaminyltransferase, branching enzyme
4	NM_007807	13058	Cybb	gp91phox cybb heme binding membrane glycoprotein also flavin and nadph domains
4	NM_025463			
4	AK016487	76989		RIKEN cDNA 4831428I11 gene
4	AK006811	73363		adult male testis riken cDNA clone:1700056e22
4	AF100956			
4	AK013503			
4	NM_009745	104112	Ady	ATP citrate lyase
4	AF332051			
4	NM_018768	18114	Nhp1	novel nuclear protein nnp1
4	NM_010925			
4	NM_018753	71912		
4	AX009578			
4	NM_026407			
5	AK020331	71907	Sic15a2	Mouse adult male epididymis cDNA, RIKEN full-length enriched library, clone 92201 (9009 protein, hypothetical NAC-1 and NAC-2 Y DNA-binding domain (A+T-rich)
5	NM_021301	57738	Arc3	soluble carrier family 15 (H+/peptide transporter), member 2
5	AF156979	170735		arrestin 3, retinal
5	NM_011113	18793	Plaur	urokinase plasminogen activator receptor
5	AK002386			
5	AK013267	72747		RIKEN cDNA 4939560E09 (Mus musculus 25 %)
5	AK006886	76618	Nit	RIKEN cDNA 1700084C06 gene
5	NM_008702	18099		nitro-like kinase nit1 related to arhgap kinases localized nucleus
5	NM_015732	12006	Atm2	atm2
5	AK017470	71446		RIKEN cDNA 5630401D24 gene
5	NM_008069	19224	Pigs1	prostaglandin-endoperoxide synthase 1
5	NM_011363			
5	AK011763	54371	Chis2	carbohydrate sulfotransferase 2; N-acetylglucosamine-6-O-sulfotransferase [Mus musculus] 100 %
5	AK007295	20723	Sp48	serine protease inhibitor sp48
5	NM_008568			
5	NM_024435	74388	Dpp8	dipeptidylpeptidase 8
5	AK016546			
5	AK014457			
5	AK008228	103850	Nicm	5,3-nucleotidase, mitochondrial
5	AB035933			
5	AK016757	74720	Hs12	Similar to Voltage-dependent calcium channel gamma-4 subunit (Neuronal voltage-gated calcium channel) [28% Human]
5	NM_008297	15500		heat shock factor hsf2
5	NM_008806			
5	NM_019425	54342	Gpnal1	glucosamine-phosphate n-acetyltransferase gpnal1
5	NM_011027	18439	P2n7	p2n7 receptor subunit
5	NM_030869	81840	Srgc2	VPS10 domain receptor protein SORCS 2
5	AF783762	170732	Tmr2	thyrotropin releasing hormone receptor 2
5	X59150	21594	Tcb-v70	T-cell receptor beta, variable V20
5	NM_013875	20741	Srbp1	beta-spectrin srbp1
5	U16746	14179	Fgfr8	fibroblast growth factor 8

Accession	Accession	Accession	Accession	Description	Accession
5 NM_013926	5 NM_013926	5 NM_013926	5 NM_013926	5 NM_013926	5 NM_013926
5 AK007156	5 AK007156	5 AK007156	5 AK007156	5 AK007156	5 AK007156
5 BC018550	5 BC018550	5 BC018550	5 BC018550	5 BC018550	5 BC018550
5 NM_003281	5 NM_003281	5 NM_003281	5 NM_003281	5 NM_003281	5 NM_003281
5 NC_001569	5 NC_001569	5 NC_001569	5 NC_001569	5 NC_001569	5 NC_001569
5 NM_050434	5 NM_050434	5 NM_050434	5 NM_050434	5 NM_050434	5 NM_050434
5 AK004111	5 AK004111	5 AK004111	5 AK004111	5 AK004111	5 AK004111
5 AK003517	5 AK003517	5 AK003517	5 AK003517	5 AK003517	5 AK003517
5 AK005891	5 AK005891	5 AK005891	5 AK005891	5 AK005891	5 AK005891
5 AK010847	5 AK010847	5 AK010847	5 AK010847	5 AK010847	5 AK010847
5 M13018	5 M13018	5 M13018	5 M13018	5 M13018	5 M13018
5 AK009205	5 AK009205	5 AK009205	5 AK009205	5 AK009205	5 AK009205
5 AK013833	5 AK013833	5 AK013833	5 AK013833	5 AK013833	5 AK013833
5 AF059177	5 AF059177	5 AF059177	5 AF059177	5 AF059177	5 AF059177
5 AK020780	5 AK020780	5 AK020780	5 AK020780	5 AK020780	5 AK020780
5 NM_013503	5 NM_013503	5 NM_013503	5 NM_013503	5 NM_013503	5 NM_013503
5 NM_025656	5 NM_025656	5 NM_025656	5 NM_025656	5 NM_025656	5 NM_025656
5 NM_008238	5 NM_008238	5 NM_008238	5 NM_008238	5 NM_008238	5 NM_008238
5 NM_010181	5 NM_010181	5 NM_010181	5 NM_010181	5 NM_010181	5 NM_010181
5 AK012521	5 AK012521	5 AK012521	5 AK012521	5 AK012521	5 AK012521
5 AJ278505	5 AJ278505	5 AJ278505	5 AJ278505	5 AJ278505	5 AJ278505
5 NM_010750	5 NM_010750	5 NM_010750	5 NM_010750	5 NM_010750	5 NM_010750
5 AF334144	5 AF334144	5 AF334144	5 AF334144	5 AF334144	5 AF334144
5 AK007473	5 AK007473	5 AK007473	5 AK007473	5 AK007473	5 AK007473
5 NM_007123	5 NM_007123	5 NM_007123	5 NM_007123	5 NM_007123	5 NM_007123
5 NM_007125	5 NM_007125	5 NM_007125	5 NM_007125	5 NM_007125	5 NM_007125
5 NM_007123	5 NM_007123	5 NM_007123	5 NM_007123	5 NM_007123	5 NM_007123
5 NM_025664	5 NM_025664	5 NM_025664	5 NM_025664	5 NM_025664	5 NM_025664
5 AK013870	5 AK013870	5 AK013870	5 AK013870	5 AK013870	5 AK013870
5 NM_009872	5 NM_009872	5 NM_009872	5 NM_009872	5 NM_009872	5 NM_009872
5 AK018698	5 AK018698	5 AK018698	5 AK018698	5 AK018698	5 AK018698
5 AK018471	5 AK018471	5 AK018471	5 AK018471	5 AK018471	5 AK018471
5 AK002581	5 AK002581	5 AK002581	5 AK002581	5 AK002581	5 AK002581
5 NM_009257	5 NM_009257	5 NM_009257	5 NM_009257	5 NM_009257	5 NM_009257
5 NM_009883	5 NM_009883	5 NM_009883	5 NM_009883	5 NM_009883	5 NM_009883
5 AK003326	5 AK003326	5 AK003326	5 AK003326	5 AK003326	5 AK003326
5 AK017032	5 AK017032	5 AK017032	5 AK017032	5 AK017032	5 AK017032
5 NM_021587	5 NM_021587	5 NM_021587	5 NM_021587	5 NM_021587	5 NM_021587
5 NM_007500	5 NM_007500	5 NM_007500	5 NM_007500	5 NM_007500	5 NM_007500
5 NM_008353	5 NM_008353	5 NM_008353	5 NM_008353	5 NM_008353	5 NM_008353
5 NM_008502	5 NM_008502	5 NM_008502	5 NM_008502	5 NM_008502	5 NM_008502
5 AK020377	5 AK020377	5 AK020377	5 AK020377	5 AK020377	5 AK020377
5 AF285091	5 AF285091	5 AF285091	5 AF285091	5 AF285091	5 AF285091
5 BC002230	5 BC002230	5 BC002230	5 BC002230	5 BC002230	5 BC002230
5 NM_010174	5 NM_010174	5 NM_010174	5 NM_010174	5 NM_010174	5 NM_010174
5 NM_009848	5 NM_009848	5 NM_009848	5 NM_009848	5 NM_009848	5 NM_009848
5 NM_029621	5 NM_029621	5 NM_029621	5 NM_029621	5 NM_029621	5 NM_029621
5 NM_021305	5 NM_021305	5 NM_021305	5 NM_021305	5 NM_021305	5 NM_021305
5 NM_013463	5 NM_013463	5 NM_013463	5 NM_013463	5 NM_013463	5 NM_013463
5 NM_015608	5 NM_015608	5 NM_015608	5 NM_015608	5 NM_015608	5 NM_015608
5 NM_006060	5 NM_006060	5 NM_006060	5 NM_006060	5 NM_006060	5 NM_006060
5 NM_022429	5 NM_022429	5 NM_022429	5 NM_022429	5 NM_022429	5 NM_022429
5 NM_018746	5 NM_018746	5 NM_018746	5 NM_018746	5 NM_018746	5 NM_018746
5 NM_003274	5 NM_003274	5 NM_003274	5 NM_003274	5 NM_003274	5 NM_003274
5 AK010986	5 AK010986	5 AK010986	5 AK010986	5 AK010986	5 AK010986
5 AK011703	5 AK011703	5 AK011703	5 AK011703	5 AK011703	5 AK011703
5 AK009278	5 AK009278	5 AK009278	5 AK009278	5 AK009278	5 AK009278
5 AK015889	5 AK015889	5 AK015889	5 AK015889	5 AK015889	5 AK015889
5 NM_022317	5 NM_022317	5 NM_022317	5 NM_022317	5 NM_022317	5 NM_022317
5 NM_008549	5 NM_008549	5 NM_008549	5 NM_008549	5 NM_008549	5 NM_008549
5 BC006699	5 BC006699	5 BC006699	5 BC006699	5 BC006699	5 BC006699
5 NM_007583	5 NM_007583	5 NM_007583	5 NM_007583	5 NM_007583	5 NM_007583
5 NM_009440	5 NM_009440	5 NM_009440	5 NM_009440	5 NM_009440	5 NM_009440
5 AF133695	5 AF133695	5 AF133695	5 AF133695	5 AF133695	5 AF133695
5 AF121215	5 AF121215	5 AF121215	5 AF121215	5 AF121215	5 AF121215
5 AK005878	5 AK005878	5 AK005878	5 AK005878	5 AK005878	5 AK005878
5 AK015740	5 AK015740	5 AK015740	5 AK015740	5 AK015740	5 AK015740
5 NM_009072	5 NM_009072	5 NM_009072	5 NM_009072	5 NM_009072	5 NM_009072
5 AK012851	5 AK012851	5 AK012851	5 AK012851	5 AK012851	5 AK012851

FIGURE 12-6

Cluster	Access	Gene	Description
6 BC006780	106035		clone mqc 8118
6 AK008493			
6 NM_010301			
6 AJ278787			
6 AK007327	110880	Scn4a	sodium channel, voltage-gated, type IV, alpha polypeptide
6 NM_018818			
6 NM_011615			
6 AF145718			
6 AK021330			
6 NM_010178			
6 BC002193	117224		Mus musculus breakpoint cluster region homolog, mRNA (cDNA clone IMAGE:3488874) K1AA0298 hypothetical protein (human-ribosomal protein L27a-suppression of tumorigenicity 5
6 NM_021471			
6 NM_013732			
6 BC004783	252973	Gn2	hypothetical protein FLJ13782 (94% human)
6 NM_007182	20451	Slit3c	sialyltransferase alpha-2,6-sialyltransferase c sialic
6 NM_016689	12971	Crym	crystallin
6 NM_011165	19110	Prpa	protectin-like protein A
6 NM_025851			
6 NM_016649			
6 NM_016655			
6 BC017692			
6 NM_008088			
6 AK009503	74182		RIKEN cDNA 2310032D16 gene
6 BC003203	104479		simple repeat sequence-containing transcript [28% Min musculus]
6 AK017887			
6 AK019885			
6 BC004728			
6 NM_025573	108014	Slit9	13 days embryo male testis riken cDNA clone:603046823; 10 clone:2810029m18
6 NM_008744	18208	Ntn1	netrin 1
6 AK004155			
6 NM_041434	70770	Amt	PQ2, MOUSE Retrovirus-induced POU polypeptide (Ectoderm) Reverse transcriptase : Ectodermes[32 % Mouse]
6 NM_009709	11983		aryl hydrocarbon receptor nuclear translocator amt
6 AK014447			
6 NM_008364	18180	ntrp	interleukin 1 receptor accessory protein
6 AK014242			
6 NM_008865	18776	P2	placental lactogen II p43
6 AK012682			
6 AK009352			
6 NM_021452	58802	Kcnmb4	potassium large conductance calcium-activated channel subfamily beta member kcnmb4
6 NM_021555	59053	Brp18	brain protein 18; DNA segment, Chr 15, ERATO D01 741, expressed [Mus musculus] 100 %
6 NM_007877			
6 AK012987	76553		ENC1, MOUSE Ectoderm-neural cortex-1 protein (ENC-1) 80 % /
6 NM_053183			
6 AK016480	Unknown		adult male testis riken cDNA clone:4931428R2
6 NM_009055	19724	Rfx1	regulatory factor X, 1 (influences HLA class II expression)
7 AF294329			
7 NM_021421	52477		DNA segment, Chr 1, ERATO D01 396, expressed - RIKEN cDNA 281030721; hypothetical protein, MNCs-4273 [Mus musculus] 100 %
7 NM_031168	16193	16	interleukin 16
7 AK011728	67629		RIKEN cDNA 2410030K01 gene
7 NM_013470			
7 AK008171			
7 NM_020422	63958	Ubcd4b	ubiquitination factor E4B, UFD2 homolog (S. cerevisiae)
7 AK008290	14358	Krt20	keratin, type II, 2 [Homo sapiens] 85 %
7 NM_019118	58148	Grasp	brain cDNA clone mch222 grp 1-associated scaffold protein grasp unannotated product
7 AK021251	78414		similar to sp:QSNUL5 - PGP1_HUMAN Probable pyrolysine-carboxylate peptidase (5-oxopropyl-peptidase) (Pyroglutamy-peptidase 48 %
7 NM_008746	18213	Nrk3	neuropathic tyrosine kinase, receptor, type 3
7 AF242376	10249	Zbt19	zinc finger protein 119 - gonadotropin hormone
7 AK033801	69336		ref:NP_247682.1 - chromodome Z1 open reading frame 51 [Homo sapiens] 82 %
7 NM_009799	12346	Car1	carboxic anhydrase 1
7 AK039898			
7 AK017510			
7 NM_020585	57430	Subx2	suboxidase-related protein SUL T.X2
7 AK020723	77784		2004395A melanin-concentrating hormone (100% Mus musculus)
7 AK017362	75738		BC2.2,like 12 (rodent rich), Bcl-2 like protein-rich protein 12 [Homo sapiens] 81 %
7 NM_007670	12579	Ccnb2b	cyclin-dependent kinase inhibitor 2B (o15, inhibits CDK4)
7 NM_015828	50796	Omt1	doubletless and mah-3 related transcription factor dmt1 candidate sexual regulatory protein; transcript
7 NM_007432	11648	Ala3	alkaline phosphatase intensive not mm requiring ala3
7 NM_008602	17344	Ala3	Mex-interacting-zinc finger
7 AK003823	74772	Ala3	18 days embryo riken cDNA clone:1110012e06
7 NM_013769			

Chapter

FIGURE 12-8

Cluster	Accession	Locust	Gene	Description
8	NM_013680	20964	Syn1	synaptobrevin 1
8	U11822	12572	Cdk7	cyclin-dependent kinase 7 (homolog of Xenopus MO15 cdk-activating kinase)
8	AK005769	75465	Dnch2b	dynen, cytoplasmic, light chain 2B
8	NM_011982	28433	Phox3	phox domain-containing protein 3
8	AK013753	75620		procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3
8	NM_033598	27681		RIKEN cDNA 4930511H01 gene
8	AK005960			DNA segment, Chr 11, KL Molecule 34
8	AK017287	71330	Myo15	T50683 RCC-like G exchanging factor RLG (Imported) (74% human)
8	NM_010682	79110		Myo15
8	AK003376	77205		Mus musculus adult male diencephalon cDNA, RIKEN full-length enriched library, clone:933016B004 product:hypothetical protein
8	AK001111			lactylkinin 1
8	NM_005311	21333	Tac1	transmembrane 7 superfamily member upregulated in kidney clone mpc:7085, tm7af1
8	NM_031899	83924	Tim/sil1	kap3a kap3b is its splice variant with a bp insertion containing stop codon.
8	NM_008743		Kltp3	kap3a kap3b is its splice variant with a bp insertion containing stop codon.
8	D50396	16579		calyculin-1 protein
8	AK020399			RIKEN cDNA 4930557B21 gene
8	NM_023051	65945	Cstn1	hypothetical protein FLJ10540 (Homo sapiens) 78 28 %
8	AK018159	75308		organic cation/carnitine transporter octn2
8	BC018220			secreted IgZeta-related sequence protein 5
8	NM_025419	74107		triglyceride motif protein tm26 alpha
8	AK004655	20520	Shc2a5	RIKEN cDNA 4930564C03 gene
8	NM_011396	54812	Shp5	heterogeneous nuclear ribonucleoprotein D-like
8	NM_018760			Elts van Creveld gene homolog (human)
8	NM_023292	22670	Trim26	ADP-ribosylation-like factor 8 interacting protein
8	AF220395			10 days embryo riken cDNA clone:2810041p18
8	NM_007822			mast-cell high affinity IgE receptor alpha-1 gamma subunit precursor
8	AK016217	75341		preferentially expressed antigen of melanoma, melanoma antigen preferentially expressed in tumors(34% human)
8	NM_018768		Hmnpd1	rho gdp dissociation inhibitor gdi gamma analog
8	NM_016630	50976		sterol regulatory element binding protein erbbp1, clone image:3598844
8	AK009469			rho type c glycoprotein rhcg
8	NM_010215	59056	Evc	denervation supersensitivity atrophy
8	NM_021292	54208	Arfip	epg-like growth factor receptor erbb3 intracellular domain
8	AF223953			RAB1, member RAS oncogene family
8	NM_019917	66576		predative nuclear protein ORF1-FL40 (Homo sapiens) 89.42
8	BC011388	14127	Fce1g	biglycan
8	NM_010165			RIKEN cDNA 5730492B19 [84.21% Mus musculus]
8	AK016374			contactin associated protein-like 2
8	NM_010765			cleavage and polyadenylation specific factor 2 100kd subunit clone image:3468033, cgs2
8	NM_010100			ironless potassium channel ml1
8	AK015911			microtubule-associated protein 1 light chain 3 alpha, MAP1 light chain 3-like protein 1; microtubule-associated proteins 1A/1B light chain 3 (100% Homo sapiens)
8	NM_008113			
8	AK007041			
8	NM_025637			
8	AK018349			
8	AK010452			
8	BC008651			
8	NM_028187			
8	NM_019799			
8	NM_007881			
8	AF059175			
8	NM_008996			
8	NM_023844			
8	AK002512			
8	NM_007842			
8	NM_015749			
8	NM_023191			
8	NM_009706			
8	AK017508			
8	AK015717			
8	AK007694			
8	NM_025771			
8	NM_016856			
8	AK014582			
8	BC014810			
8	NM_010595			
8	AK007805			
8	BC010596			

FIGURE 12-9

Cluster	Access	Locus	Gene	Description
6 AK006699				
8 AK015304		78916		RIKEN cDNA 4930425K24 gene
8 NM_017136		17335	Mre11a	mitotic recombination 11 homolog A (S. cerevisiae)
8 AK009420		66381		Z163_HUMAN Zinc finger protein 163 92 %
8 AF292935				rhodopsin
8 NM_016590		212541	Rho	Mus musculus 13 days embryo head cDNA, RIKEN full-length enriched library, clone:3110003A17 product:unknown EST
8 AK013084		73112		protein inhibitor of activated STAT 3
8 NM_018812		226815	Pis33	10 days embryo riken cDNA clone:2610509c22
8 AK012084		28107		CMG3_HUMAN Capillary morphogenesis protein-2 precursor (CMG-2)/85
8 BC003308		71914		
8 NM_008085				
8 AK007787				
8 NM_010728				
8 NM_008123		14616	Gja8	gap junction membrane channel protein alpha (gja8)
8 AK000163		76730		RIKEN cDNA 2310005C01 gene
8 AK002942		74004	Riuc1	light junction protein 4 (peripleral); hypothetical gene supported by AK024268; AL117398; protein (85% human)
8 BC019186		106707		ribosomal large subunit pseudouridine synthase C like
8 NM_016712		50874	Tropo4	tropomodulin 4
8 NM_013877		29855	Cebp5	calcium binding protein 5
8 NM_026002				
8 NM_019601		14802	Gria4	glutamate receptor ionotropic ampa4 alpha 4 Gria4
8 NM_011813				
8 NM_021432		58243		hypothetical protein, MNCB-0385 [Mus musculus]
8 NM_007427				
8 BC002098		226591		RIKEN cDNA 1810011K17 gene
8 AK015351		74691		adult male testis riken cDNA clone:4830441e05
8 AK018428		67120		RIKEN cDNA 2700016E09 gene
8 NM_017400		20408	Sh3p3	SH3-domain GRB2-like 3
8 BC003922		52615		DNA segment, Chr 11, ERATO Del 530, expressed
8 NM_009401				
8 NM_009398		21930	Tnfrsf6	tumor necrosis factor induced protein 6 tnfrsf6
8 NM_020579				adult male testis riken cDNA clone:483045321
9 AK015452		75796		
9 AK011571				
9 NM_019740				
9 NM_023371				
9 AK003311				
9 NM_009133				
9 AK005510				
9 AK018431				
9 NM_025592				
9 U19891				
9 AK004444		12507	Cebpa-es1	putative c/ebf binding factor mdel alternatively spliced transcript mcd81 1 mcd81; 8 days embryo riken cDNA clone:5730400m10 full insert sequence
9 AK015090		74167	Nu89	nuclei (nucleoside diphosphate kinase moiety X)-type motif 9
9 BC004068				
9 NM_011237		18387	Rad9	RAD9 homolog (S. pombe)
9 AK003534		71787		tRNA selenocysteine associated protein [Homo sapiens] 98.84 %
9 NM_031376		63490	Bcap	b cell phosphoinositide 3-kinase adaptor bcap
9 NM_008902		17820	Myo6	myosin VI myo6
9 NM_007733		12823	Col18a1	adult male testis riken cDNA clone:4831428b13 full insert sequence; collagen a 1 xtc chain
9 AK006004		72245		RIKEN cDNA 1700018M17 gene
9 M64067		12151	Bmi1	B lymphoma Mo-Mu-MLV insertion region 1
9 NM_010838		17703	Mlx3	mex3 the drosophila melanogaster muscle segment homeobox mesh protein encoded by genbank accession number u33319
9 NM_026085				
9 NM_008927				
9 BC006083		26395	Map2k1	mitogen activated protein kinase 1
9 AK010292				
9 NM_031261				
9 NM_009347				
9 NM_060633		11429	Aco2	mitochondrial acetylase nuclear aco2 clone msc7146
9 AK015706		107787	Scamp1	SECRETORY CARRIER-ASSOCIATED MEMBRANE PROTEIN 1
9 NM_011861				
9 NM_018918		27140	Tbx3	T-cell leukemia, homeobox 3
9 NM_010819				
10 BC016210		67017		chromosome 20 open reading frame 108 [Homo sapiens] 77 %
10 NM_011594		21856	Timp2	timp-2 tissue inhibitor of metalloproteinases type 2; metalloproteinase
10 NM_022327		64143	Rab6	viral simian leukemia viral oncogene homolog B (ras related)
10 NM_010003		16025	Nf2c3	nuclear factor, erythroid derived 2, like 3
10 AF398966		76204	Aub5	ankyrin repeat and SOCS box-containing protein 5
10 AK015619				

FIGURE 12-10

Cluster	Accession	Locusts	Gene	Description
	10 AK011500			
	10 NM_021534	59038	Pmp4	peritubular membrane protein 4
	10 NM_025921	52502		DNA segment, Chr 10, EP0410 Col 465, expressed
	10 AK015584			
	10 AJ131621	11938	Abp2a2	sarcoendoplasmic reticulum c22+ alpha srra2b
	10 AK012385			
	10 NM_033816			
	10 NM_009783			
	10 NM_019432	70348		
	10 AK008713		Rpx1	leucine-rich and death domain containing, p53 protein induced, with death domain [Mus musculus] 40.00 %
	10 NM_024458	20028		rod photoreceptor rpx1
	10 NM_022418		Rpxn	
	10 NM_030744	76376	Rpxn	rod photoreceptor rpx1
	10 AK012248	72322	Xpn5	ropomn bc81026
	10 U14172			expentin 5
	10 NM_007261	20744	Spnr	spnr rna binding protein
	10 AK014636			
	10 NM_011018	18412	Sqstm1	sequestrin 1
	10 BC004840	97064	atp6v1d	transcriptional co-activator with PDZ-binding motif (TAZ) [91% Homo sapiens]
	10 NM_023721	73604		ATPase, H ⁺ transporting, V1 subunit D
	10 NM_011035			
	10 NM_013842		Msf4a6c	membrane-spanning 4-domains, subfamily A, member 6C
	10 NM_026595	73656		
	10 AK007129			
	10 AK017033	74472		RIKEN cDNA 493343C11 gene
	10 NM_006604			
	10 NM_019190	56383	Tme1f2	transmembrane protein with EGF-like and two folistatin-like domains 2
	10 NM_007400	11776	Ap3b	mbiv homolog of bovine leukemia virus receptor
	10 NM_029682			
	10 NM_007462		Apc	apc putative
	10 AK013874	11789		
	10 NM_009889		Cycl	adult male testis riken cDNA clone: 1700001d24
	10 AK021408	13067		-139487 testin - human 51.80 %
	10 AK007589	78133		mannosidase, beta A, lysosomal-like [Homo sapiens] 89 %
	10 AK010014	69161		TU429 protein precursor [Homo sapiens] 63 %
	10 BC011457	76833		
	10 NM_008707		Nmi1	N-myristoyltransferase 1
	10 NM_020514	18107		
	10 AK016162			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone: 4930557G23 product:homodomain interacting protein phase 1
	10 AK016162	57423	Abp5f2	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit f, isoform 2
	10 AK020582			
	10 AK020081	75036		CERUL_MOUSE CERULOPLASMIN PRECURSOR (FERROXIDASE) [96% Mus musculus]
	10 AK015642		Sdc4	syndecan 4 clone ngc:11456, ryudocan core protein
	10 NM_011521	20971		
	10 NM_018762			
	10 NM_018884			
	10 X74266			
	10 NM_028460	75635		riken cDNA 4930562n12 4930562n12nt
	10 BC016102			
	10 NM_030686			
	10 AK009010			
	10 NM_053188			
	10 NM_011592			
	10 AK011122			
	10 NM_027069	24053	Sqog	sarcoplasmic gamma 35kd dystrophin-associated glycoprotein sqog
	10 NM_018955			
	10 AK005098	23963	Odz1	odd/Odian-in homolog 1 (Drosophila)
	10 NM_011908	68966		RIKEN cDNA 1500001L15 gene
	10 NM_020483		Hmgp3	11 days embryo riken cDNA clone:2700016d05 full insert sequence; hmgp
	10 NM_008253	57230		high mobility group protein homolog hmgp and protein
	10 NM_008982	15354	Pgrdr	prostaglandin D receptor
	10 AK011578	18214		
	10 NM_025640			
	10 NM_021505			
	10 AK017848			
	10 AK016312			
	10 U09K38			
	10 NM_009143		Taf1c	TATA box binding protein (Tbp)-associated factor, RNA polymerase I, C
	10 NM_021441	21341		
	10 AB042432			

FIGURE 12-11

Cluster	Access	Locus	Gene	Description
10	NM_011025	18429	Ort	oxylodh-neurophysin I
10	AK012283	72569	Ort	RIKEN cDNA 270023.009 gene
10	NM_007750	12869	Cor8a	adult male kidney riken cDNA clone:0610011c24
10	NM_026460			
10	AK009450	71904		RIKEN cDNA 2310021M12 gene
10	NM_024469			
10	NM_011946			
10	AK013393	72843		PRD4_HUMAN PR-domain zinc finger protein 4 (93.17% human)
10	NM_019885	50760	Clec2	10 day old male pancreas riken cDNA clone:1810081f13; c-type lectin-like receptor 2 clec2
10	AK018430			
10	NM_021022	27413	Abcb11	ATP-binding cassette, sub-family B (MDR/TAP), member 11
10	NM_023725	66717		RIKEN cDNA 4921513E06 [Mus musculus] 100 %
10	AK006468			dolichyl-di-phosphoglycerate-protein glycotransferase odost
10	NM_007636	13200	Ddost	
10	AK018411			
10	NM_025424	70050		splicing coactivator subunit SFR300; RNA binding protein; AT-rich element binding factor; serine/ar 27 %
10	AK006402			
11	NM_011049			adult male colon riken cDNA clone:9030623c06
11	AK018587	66809		
11	AK015480			
11	AK0033781			
11	NM_000550	22715	Zfp57	
11	NM_009684	11783	Apaf1	apoptotic protease activating factor apaf1 cad-4
11	AF155583			
11	NM_010668			
11	AK013505			
11	AK006388			
11	NM_031388			
11	AK015916			
11	NM_028478			
11	AK005136			
11	AK010547			
11	NM_010590			
11	AK006683			
11	NM_025786	66784		RIKEN cDNA 4933439F11 100% Mus musculus
11	AK015711			
11	AK007938			
11	NM_031382	83556	Tex16	testis expressed gene 16
11	NM_010610	16531	Kcnnk1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1
11	AK016572			
11	NM_009334	21419	Tcfap2b	transcription factor ap-2 beta tcfap2b
11	NM_007772	110521	Hlup1	encoding zinc finger protein alpha-oryon 1 paritai; crystallin alpha binding cryabp1
11	AK003782			
11	AK019938	321015		RIKEN cDNA 5330439B14 gene
11	AB039178			liver glycogen phosphorylase
11	AF220138	110095	Pygl	c57bl/6j sec81 protein complex gamma subunit sec81-gamma
11	BC013636	20335	Sec81g	
11	NM_011343			glutamate receptor ionotropic kainate 2 beta grk2; channel subunit beta-2
11	BC016547			
11	AF121876	14808	Grk2	
11	NM_010340			
11	NM_007491	12192	Zfp381	zinc finger protein 38, CCH type-ii-like 1
11	NM_007494			
11	NM_009253			
11	NM_013782			
11	AK018437			
11	NM_020585	57437		HSPC041 protein [95% Homo sapiens]
11	NM_013508			
11	NM_013597	17258	Mez2a	myocyte enhancer factor 2a mez2a
12	NM_023670			
12	NM_011632			
12	NM_008377			
12	NM_026100	67443	Map1lc3	microtubule-associated protein 1 light chain 3
12	NM_019978	13175	Dcam1l	double cortin and calcium/calmodulin-dependent protein kinase-like 1
12	NM_020282	258755	MOR32-4	orphan receptor MOR32-4 - odorant receptor S46 gene [Mus musculus] 97 %
12	NM_020021	17451	Mos	Mohseny sarcoma oncogene
12	NM_011423	20801	Smr3	subunitary gland androgen regulated protein smr3, msg1
12	AK015703	75039		RIKEN cDNA 4930505H01 gene
12	AF296075	81898	Wdr10	WD repeat domain 10
12	AK014338			

FIGURE 12-12

Cluster	Access	Access	Access	Description
12 AK018388	77134	Mus musculus 12 days embryo head cDNA, RIKEN full-length enriched library, clone:3010025E17 product: HETEROGENEOUS NUCLEAR RIBONUCLEOPROTEIN A0 (HNRP A0) homolog [Homo sapiens]		
12 NM_001469	67112	Fur22		
12 AK008922	209102	mori17.1		
12 AF133300	68038			
12 BC006978				
12 AK005603	12566	Cdh2		
12 NM_016756	13941	Epha7		
12 AB1466	56057	Bta4		
12 AK051270	16880	Lifr		
12 NM_013594	78125			
12 AK019581				
12 NM_026331	55589	Ncl5		
12 AK004107	258740	MOR17.1-12		
12 NM_018868				
12 AF282272				
12 AK004406				
12 BC003275	67883	Ux1		
12 AK005538	57441	Gmnn		
12 NM_020567				
12 NM_016592	17064	C1orf1		
12 NM_010740	68303			
12 NM_026567	65973	Asph		
12 NM_020503	68258	Mpra17		
12 NM_023066				
12 NM_025450				
12 NM_026518				
12 AK002797				
12 AK019494	78261	Sarh3		
12 NM_016926	53690	Gna13		
12 NM_010303	14674	Pipr21		
12 NM_011677	24000	Pivp22		
12 NM_011637	15273			
12 AK012430				
12 BC017532				
12 NM_007563	12183	Bpdm		
12 AK021254				
12 AK016870				
12 NM_024472	79554			
12 AK005178	76505			
12 AK020680	76569			
12 AK019700	67712	Mscp		
12 NM_007376	11304	Abca4		
12 NM_005201	20944	Svt5		
12 AK017294				
12 AK012825				
12 NM_008101	20130	Rras		
12 D17583	18552	Pcsk5		

Figure 12-13

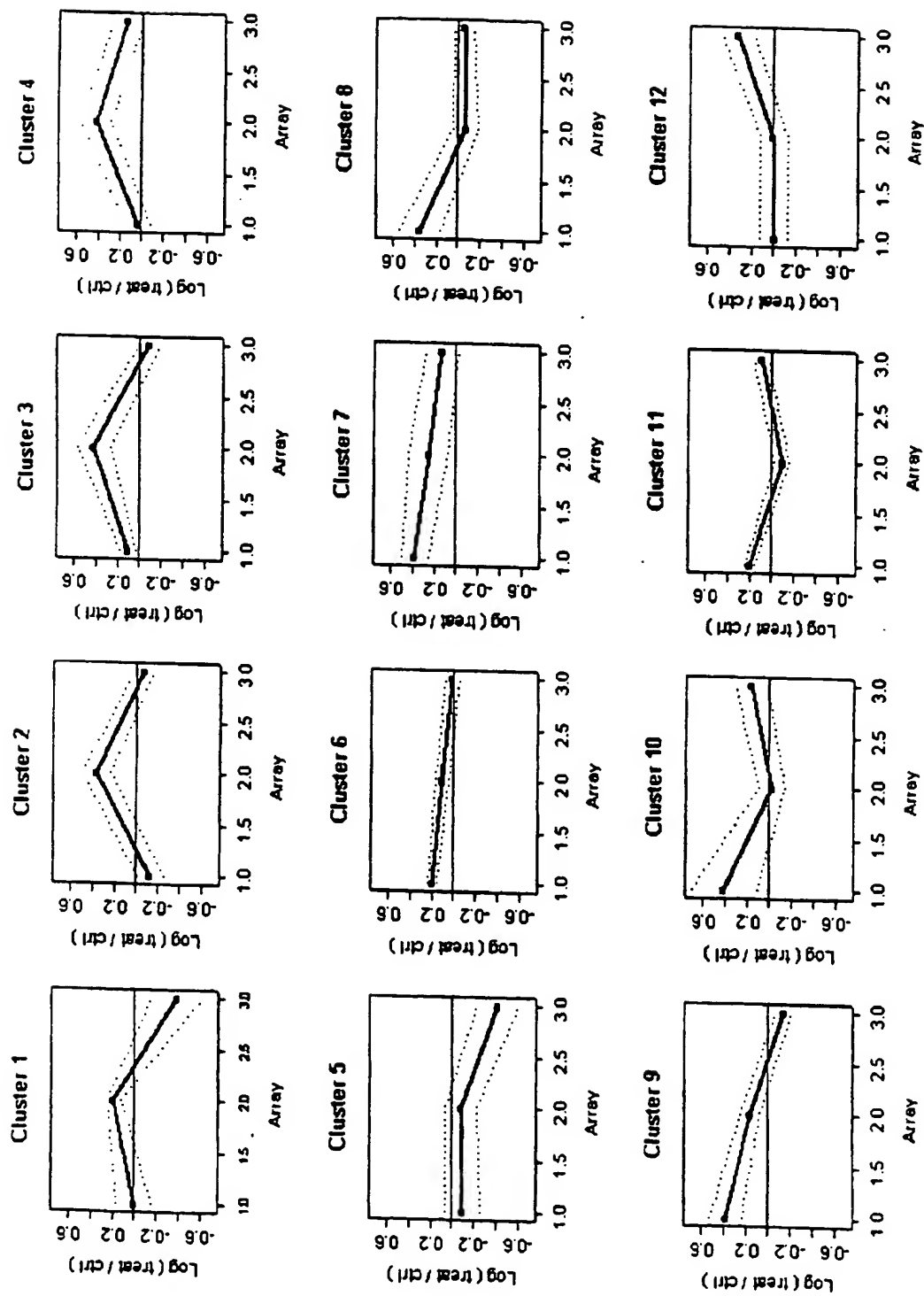


FIGURE 13-1

Cluster	Access	Locus	Gene	Description
1	NM_009020	19374	Rag2	recombination activating gene 2
1	NM_009125	20239	Scd2	spinocerebellar ataxia 2 homolog (human)
1	AK010876	68628	Cu4a	Similar to hypothetical protein FLJ20546 [82% Homo sapiens]
1	BC010211	99375	Cu4a	culin 4A
1	NM_011798	23832	Xcr1	chemokine (C motif) receptor 1
1	NM_028120	72140	RIKEN cDNA 2610507L03 [Mus musculus]	100 %
1	NM_019476	28849	Olfr159	olfactory receptor 159
1	NM_019583	50905	Il17br	interleukin 17B receptor
1	NM_013516	14126	M4a1	major histocompatibility complex class II alpha chain
1	NM_009420	22024	Tpx1	testis specific gene 1
1	X51532	14177	Fgfr6	fibroblast growth factor receptor 6
1	NM_015785	53604	Zobp	zona pellucida binding protein
1	NM_024203	67544	RIKEN cDNA 4932442K09 [Mus musculus]	100 %
1	AK008108	72043	Sulf2	sulfatase 2
1	AK009135	73919	hypothetical protein A-211C6.1(87% human)	
1	AK005679	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700041N15 product:CHEMOKINE-LIKE FACTOR 2 VARIANT 2		
1	BC006600	60321	Wbp11	WW domain binding protein 11
1	NM_011353	20365	Sor11	small EDRK-rich factor 1
1	NM_007412	11536	Admr	adenomedin receptor
1	AK008387	72123	Usp14	Mus musculus adult male small intestine cDNA, RIKEN full-length enriched library, clone:2010108K11 product:hypothetical protein
1	NM_021522	59025	Usp14	ubiquitin specific protease 14
1	AK006527	66727	Parp3	H-rev107-like protein 5 [Homo sapiens] 69 %
1	NM_011184	19167	Parp3	proliferation associated protein 3
1	AK016859	71156	RIKEN cDNA 1700012A03 gene	32 %
1	AK005884	76382	Hk1	herectokine 1
1	NM_010438	15275	Pxp	peroxisomal protein
2	AK005096	70364	Dync	DYNCL1, HUMAN Dynactin complex 50 kDa subunit [50 kDa dynein-associated polypeptide] (Dynamitin) (DCTN- 94 %
2	AK009149	69654	RIKEN cDNA 4921507P07 gene	
2	AK014840	70821	RIKEN cDNA A330104J06 gene	
2	NM_009838	77785	Chaperonin subunit 6a (C. elegans)	
2	AF343752	12466	unc-84 homolog A (C. elegans)	
2	AJ297743	30934	tor1n family 1, member B	
2	AK016890	71059	serine/threonine kinase FKSC81 [Homo sapiens] 44 %	
2	NM_013908	30839	F-box and WD-40 domain protein 5	
2	NM_023517	69583	Ankrd3	tumor necrosis factor (ligand) superfamily, member 13
2	NM_023663	72388	Ctr1	ankyrin repeat domain 3
2	NM_023755	81879	FKBP8	transcription repressor ctn-1 developmentally regulated related to the qz2 family of factors
3	NM_010223	14232	FKBP8	FK506 binding protein 8
3	NM_007690	12648	Chd1	chromatin binding protein chd-1
3	NM_008055	14368	Fcd4	frizzled homolog 4 drosophila fz44
3	NM_011919	26356	Ing1	inhibitor of growth factor 1
3	NM_013866	25813	Zfp385	zinc finger protein 385
3	AK008233	72076	Tom1	vesicle-associated membrane protein (VAMP)-associated protein of 33 kDa; vesicle-associated membrane 51.26%
3	NM_011622	21968	Blsp1	target of myb1 homolog (chicken)
3	NM_009751	12057	R75183	beaded filament structural protein in lens-CP94
3	BC004774	97998	Trim11	expressed sequence R75183
3	NM_053168	94091	Trim11	tripartite motif protein trim11
3	AK012215	212772	Copz1	RIKEN cDNA 2700007P21 gene
3	NM_015817	56447	Copz1	copz1 noncatalytic coat protein zeta-cop
3	AK011451	72149	Parva	Similar to amphipathic lateral sclerosis 2 (juvenile) chromosome region, candidate 2 [50% Human]
3	AK004960	67998	Parva	Similar to PRP1, HUMAN Salivary protein-rich protein precursor (Clone CP3, CP4 and CP5) [Contains: Basic peptid 35 % human
3	NM_020606	57342	Asd2	parvin, alpha
3	NM_008554	17173	Twist1	achaete-scute complex homolog-like 2 (Drosophila)
3	NM_011658	22160	Twist1	twist gene homolog 1 (Drosophila)
3	NM_010401	15109	Hai	histidine ammonia lyase
3	AK006533	69519	Clec4d	RIKEN full-length enriched library, clone:5430405H02
3	AK017271	56222	Clec4d	Y6C1, HUMAN Putative protein DJ747H23.2 (92 % human)
3	NM_019583	13482	Dpp4	RIKEN full-length enriched library, with Glu/Asp-rich carboxy-terminal domain, 4
3	NM_010074	22232	Sic35b2	Cx36/300-interacting transactivator, with Glu/Asp-rich carboxy-terminal domain, 4
3	NM_078484	26975	Pcd	soluble carrier family 35 member sic35a2 udp galactose translocator; mug11 udp-galactose transporter
3	Y19185	16490	Kor2	piccolo (presynaptic cytomatrix protein)
3	NM_009417			potassium voltage gated channel related subfamily member 2

FIGURE 13-2

Cluster	Access	Locus	Gene	Description
3	X99456			M.musculus ORF 1 and ORF 2 genes
3	AK011654	70420	Trap100	Mus musculus 10 days embryo whole body cDNA, RIKEN full-length enriched library, clone:2610034B18 product:hypothetical protein
3	NM_011869	23969		thyroid hormone receptor-associated protein
3	NM_022888	64931	Folr4	folate receptor 3 folbp3 folbp3 binding protein
4	AK020739			expressed sequence AIZ56456
4	AK012535	101513		ecotropic retrovirus receptor w1
4	NM_007513	11987	Slc7a1	phospholipase C, delta
4	NM_019876	18799	Ptcd	Similar to progesterone-induced blocking factor 1 [89% Homo sapiens]
4	AK015781	75821		RIKEN cDNA 231001Q16 gene
4	NM_025519	66371		similar to contraptin-like protease inhibitor related protein (CPH-23) [Rattus norvegicus]
4	NM_028740			Eafl1 protein
4	AK016628	74427	Eafl1	GTP binding protein 3
4	AY029613	70359	Gipbp3	muon 3, intestinal
4	AF027131	17832	Muc3	T12515 hypothetical protein DKFZp434B103.1 - (28% human)
4	AK014905	70892		springosine phosphatase 1
4	NM_009163	20397	Sgpl1	cyclin-dependent kinase 5
4	NM_007668	12568	Cdk5	zinc finger protein 316; kruppel-related zinc finger protein [Mus musculus] 100 %
4	NM_017467	54201	Zfp316	brain expressed myeloblastosis oncogene
4	AK013780	107771	Bmyc	POU domain, class 3, transcription factor 2
5	NM_008899	18992	Pou3f2	phosphoprotein associated with glycosphingolipid-enriched microdomains
5	NM_053182	94212	Pag	adult male testis riken cDNA clone:493433705
5	AK017036	71275		ras homolog gene family, member H
5	AK017885	74734	Arh	cytotoxic T-lymphocyte-associated protein 4
5	NM_009843	12477	Ctla4	RIKEN cDNA 4930539A06 gene
5	AK015993	75156		nebulin-related anchoring protein
5	NM_008733	17175	Nrap	soluble carrier family 12 member 7
5	NM_011390	20499	Slc12a7	DO17_HUMAN Probable RNA-dependent helicase p72 (DEAD-box protein p72) (DEAD-box protein 17) 49 % /
5	AK014620	74351		apolipoprotein M
5	BC003785			ribosomal protein mitochondrial 114 (pm14)
5	NM_018816	55938	ApoM	gamma-aminobutyric acid gamma-a receptor subunit beta 2 gabrb2
5	NM_025302	27388	Mpr2	pancreas specific transcription factor, 1a
5	NM_008070	14401	Gabrb2	RIKEN cDNA 2610510D14 gene
5	NM_016809	18213	Pt1a	nucleic acid phosphatase linked moiety X1-type motif 7
5	NM_025594	66492		hypothetical protein MGC14827 (85% human)
6	AK004924	67528	Nudt7	2119399A elongin B [Homo sapiens] 72 %
6	NM_026613	68201		RIKEN cDNA 0510008B14 gene
6	NM_028218	72381		Dullard homolog (Xenopus laevis)
6	BC002189			F-box only protein 34, ref:NP_060413.1 - hypothetical protein FLJ20725 [Homo sapiens] 75 %
6	AK012083	68354	Dullard	RIKEN cDNA 4930451F05 gene
6	AK020018	76938	Fbxo34	IKK5_MOUSE Interferon-induced 35 kDa protein homolog (IFP 35) (100% Mus musculus)
6	AK015385	74673		EST C77284
6	BC008158	70110		UDP-glucose dehydrogenase
6	AK007657	69151	C77284	pellino 1, ref:NP_075613.1 - pellino 1; RIKEN cDNA 2810468L03 gene [Mus musculus] 100 %
6	BC003975	30853	Ugdh	nuclear receptor subfamily 4, group A, member 3
6	NM_009466	22235	Pel1	RIKEN cDNA 2410012M07 gene
6	AK020915	67245	Nr4a3	slauflin msa-binding protein homolog drosophila slau1; adult male liver riken cdna clone:1300014g04
6	NM_015743	18124		alpha 2B-sialyltransferase p43 synthase putative
6	AK010476	71979	Slau1	GlyE-like 2, mitochondrial
6	NM_011490	20853	Slau1	B lymphoid kinase
6	NM_011374	20449	Slau8a	WNT1 inducible signaling pathway protein 1
6	AK020311	17714	Gpep2	sialyltransferase 9 (CMP-NeuAc:beta-cyanoarabide alpha-2,3-sialyltransferase)
6	NM_007549	12143	Blk	X-ray repair complementing defective repair in Chinese hamster cells 2
6	NM_018665	22402	Wsp1	hypothetical protein R31449_3 - human (fragment) (89% human)
6	NM_011375	20454	Slau9	RIKEN cDNA 9130204G15 gene
6	NM_020570	57434	Xrcc2	Similar to myeloid/lymphoid or mixed-lineage leukemia 2 [41% Human]
6	AK010963	70312		epithelial membrane protein-1
6	AK020272	77675		amyloid beta (A4) precursor protein-binding, family A, member 3
6	AK016775	68765	Emp1	choline kinase-like
6	NM_010126	13730		mitochondrial ribosomal protein S18C; CGI-134 protein; mitochondrial ribosomal protein S18-1 [Homo 78 %
6	NM_018758	57267	Atp3a3	
6	NM_007682	12651	Chk1	
6	AK004139	68735		

FIGURE 13-3

Cluster	Access	Gene	Description
6	NM_010865	Luce7	
6	NM_013592	Myoc	myocilin
6	NM_011203	Mann4	matrilin 4
6	AK005063	Pign12	protein tyrosine phosphatase, non-receptor type 12
6	NM_019825	Rap1ga1	Rap1, GTPase-activating protein 1
6	NM_016896	Ncoab6	nuclear receptor coactivator 6
6	NM_027032	Gpc1	glypican 1
6	NM_021339	Perp	p53 apoptosis effector related to Pmp22; p53 apoptosis-associated target [Mus musculus] 100 %
6	NM_009920	Cdon	oncofene-regulated cell adhesion molecule orcam
6	NM_016660	Cnrl	cornichon-like
7	NM_013819	Hmgal1	high mobility group AT-hook 1
7	NM_016660	Olfr67	olfactory receptor 67
7	NM_009903	Cldn4	claudin 4
7	AK007868		mucin 10, submandibular gland salivary mucin [Mus musculus] 30 %
7	NM_023831		RIKEN cDNA 1500035H01 gene
7	NM_013403	Bint1a1	bulkyophlin, subfamily 1, member A1
7	X58472	Kin	anilgenic determinant of rec-A protein
7	NM_009814	Casq2	caldesmon 2
7	AK011324		Mus musculus 10 days embryo whole body cDNA, RIKEN
7	NM_010351	Gsc	goosecoid gsc
7	AK017387		RIKEN cDNA 5430433J05 gene
7	NM_053192	Ucc1	upregulated in colorectal cancer gene 1
7	NM_011044	Pck1	phosphoenolpyruvate carboxykinase 1, cytosolic
7	AK004654		similar to A45307 98K GTPase-activating protein ABR, brain - human 29 %
7	AK004552		Similar to hypothetical protein FLJ11259 [Homo sapiens] 93 %
7	AK019832		alcohol dehydrogenase 6 (class V), pseudogene 1
7	AF282291	MOR171-8	olfactory receptor MOR171-8
7	NM_026318	Map2k8	Huntingtin interacting protein K; hypothetical protein [Homo sapiens] 99
7	X97052	Zfp106	mitogen activated protein kinase kinase 8
7	AF060246	Trpm1	zinc finger protein 106
7	NM_018752		transient receptor potential cation channel, subfamily M, member 1
7	NM_016768	Pbx3	pre B-cell leukemia transcription factor 3
7	AK007540		hypothetical protein FLJ23467 [Homo sapiens] 93 %
7	AK007667		RIKEN cDNA 2310016G11 gene
7	AK009387	Bst1	bone marrow stromal cell antigen 1
7	NM_009763		RIKEN cDNA 6330583M11 gene
8	AK017529		DNA segment, Chr 8, ERATO D01 533, expressed
8	NM_024465		Similar to nuclear prelamins A recognition factor, isoform a [84 % Homo sapiens]
8	AK013432	Odz2	odd Oz/ten-m homolog 2 (Drosophila)
8	NM_013454	Abca1	ATP-binding cassette, sub-family A (ABC1), member 1
8	NM_009214	Sms	spermatine synthase
8	NM_032002	Nrg4	neuregulin 4 nrg4
8	NM_023296	Zfp120	zinc finger protein 120
8	NM_008348	B10ra	interleukin-10 receptor alpha
8	AF282285		Mus musculus odorant receptor K30 gene
8	NM_080450	Gje1	gap junction membrane channel protein epsilon 1
8	AK014490		CA00_HUMAN Protein CGI-100 precursor (89% human)
8	NM_005550	Man2b2	mannosidase 2, alpha B2
8	AK016497		RIKEN cDNA 4931431F19 gene
8	M12289	Myf18	perinatal skeletal myosin heavy chain 3 end
8	AK005911		hypothetical protein DKFZp434A1022 [Homo sapiens] 39.00 %
8	NM_013714		interferon response element binding factor 1
8	AK021182	treb1	RIKEN cDNA C330005D17 gene
8	AK016707		Similar to APXL_HUMAN Apical-like protein (APXL protein) huma 28 %
8	AK004934	Hgf	hepatocyte growth factor
8	X72307	Kcnb3	potassium voltage-gated channel, shaker-related subfamily, beta member 3
8	NM_010599	Nkfbie	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, epsilon
8	NM_008590	Epc3	ectoplacental cone, invasive trophoblast giant cells, extraembryonic ectoderm and chorion sequence 3
8	NM_025310		SMC2 structural maintenance of chromosomes 2-like 1 (yeast)
8	NM_008017	Sme211	microsomal triglyceride transfer protein
8	NM_008642	Mtp	Similar to hypothetical protein MGC10999 [Homo sapiens] 81.25 %
8	AK008736		histidine rich calcium binding protein
8	NM_010473	Hrc	

FIGURE 13-4

Cluster	Access	Locus	Gene	Description
8	AK020050	71113	Khl2	sp O95198 - KHL2, HUMAN Kelch-like protein 2 (Actin-binding protein Mayven) 98 %
8	AK019095	78887		similar to pir-100322 - 100322 hypothetical protein KIAA0542 - human 62 %
9	AK013202	20467	Sn3b	transcriptional regulator, SIN3B (yeast)
9	AK011897	72495		RIKEN cDNA 2610206C17 gene
9	NM_019435	104130	Np15	Nuclear neuronal protein 15.6
9	AK002774	72114		hypothetical protein MGC16435 [Homo sapiens] 51 %
9	NM_009237	20675	Son3	SRY-box containing gene 3
9	AK017530	70502		RIKEN cDNA 5730405E15 gene
9	NM_010671	16659	Krip13	keratin associated protein 13
9	NM_011054	16575	Pde1c	phosphodiesterase 1C
9	NM_007986	14089	Fap	fibroblast activation protein
9	NM_026031	67205	Cg94	CGI-94 protein
9	NM_009827	12425	Cckar	cholecystokinin A receptor
9	NM_027170	69698		JC6547 high sulfur protein BZE - rat 37 %
9	AK018149	70729	Capon	C-terminal P102 domain ligand of neuronal nitric oxide synthase
9	AK000306	69533		similar to keratin associated protein 4.7 [31% Homo sapiens]
9	NM_008667	17936	Nab1	Ngl-A binding protein 1
9	NM_013728	27216	Olr154	olfactory receptor 154
9	NM_013476	11835	Ar	androgen receptor
9	AK018541	71564		9030607L17RIK RIKEN cDNA 9030607L17 gene
9	NM_023175	52633		Nil protein 2 [89% Homo sapiens]
9	AK017362	75736		BCL2-like 12 [proline rich]; Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
9	AK017569	74737		RIKEN cDNA 5730417B17 gene
9	AF067063			2-cell-stage, variable group, member 1; variable group of 2-cell-stage gene family
9	NM_026309	67678	Nrlb11	LSM3_HUMAN US snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
9	NM_010909	18038	Ndub5	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
9	NM_025316	66046	Mrp4	NAADH dehydrogenase (ubiquinone) 1 beta subcomplex
9	NM_023167	66163		mitochondrial ribosomal protein L4
9	NM_033476	21422	Tcfp2	alpha-globin transcription factor cfp2
9	AK007013	74282		atp synthase h+ transporting mitochondrial f1f0 complex subunit e atp5k; itm-1 f1f0-epsilon
9	NM_007507	11958	Alp5k	HSPC039 protein [Homo sapiens] 100 %
9	AK004076	68036	Dnajp12	md10 deduced amino acid sequence of is homologous to c. elegans putative dnaJ protein z73102 b0035.14, homolog
9	NM_019965	56709		RIKEN cDNA 1700006J14 gene
9	AK005678	321010		undifferentiated hypodermis protein HCDASE [77% Homo sapiens]
9	NM_025655	52665		chemokine (C-C motif) ligand 4
9	NM_025816	52440	Cck4	Tex1 (human T-cell leukemia virus type 1) binding protein 1; tax1 binding protein [Homo sapiens] 80 %
10	NM_013552	20303		Mus musculus adult male corpus striatum cDNA, RIKEN full-length enriched library, clone: C030048J01 product: hypothetical protein
10	AK021160	77478		ref:NP_061935.1 - hypothetical protein FLJ20225 [Homo sapiens] 68 %
10	NM_021496	59998	Pvt13	poltovirus receptor-related 3
10	NM_007574	12262	C1qg	complement component 1, q subcomponent, gamma polypeptide
10	AK012664	69922	Vrk2	vaccinia related kinase 2
10	AK018444	52504		expressed sequence AA48222
10	NM_030701	80885	Puma-g	putative seven transmembrane spanning receptor puma-g
10	NM_019745	56426	Potat10	programmed cell death 10
10	NM_023217	66522		PCP1, HUMAN Probable pyridoxine-carboxylate peptidase (5-oxopropyl-peptidase) (Pyroglutaminyl-peptidase 85 %
10	NM_080638	78388	Mwp	major vault protein
11	AK018101	75286		S86819 Mus 20 protein - (42% human)
11	NM_009759	12169	Bmx	BMX non-receptor tyrosine kinase
11	AK019053	Unknown		Mus musculus adult male stomach cDNA, RIKEN full-length enriched library, clone: 2210018M05 product: mdline 1
11	NM_006948	128951	Cpt1b	canine palmitoyltransferase 1, muscle
11	NM_033269	12671	Chrm3	ACM3_MOUSE Muscarinic acetylcholine receptor M3 (Mm3 mAChR) 100 % /
11	NM_010815	17444	Mena	monocytic adaptor
11	NM_013657	20348	Sema3	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3C
11	AK019168	69691		HSPC182 protein [89% Homo sapiens]
11	AJ245739	14683	Gnas	GNAS (guanine nucleotide binding protein, alpha stimulating) complex locus
11	NM_025327	66059		18 days embryo nten cDNA clone: 1110002b21
11	NM_019755	18924	Plp2	proteolipid protein 2 [Mus musculus] 100 %
11	NM_013848	27028	Ermap	erythroblast membrane-associated protein
11	NM_008634	17755	Msap1b	microtubule-associated protein 1 B
11	NM_011333	20286	Ccd2	chemokine (C-C motif) ligand 2
11	NM_010628	16578	Kif9	kinesin 9 klf9
11	NM_031373	72075	Ogfr	opioid growth factor receptor

FIGURE 13-5

Cluster	Accession	Gene	Location	Description
11	NM_025914	Palp1	68970	PAL-1 mRNA-binding protein
11	AK005472	Rassf6	73246	Ras association (RafGDS/JAF-6) domain family 6
11	NM_021483	Pez2	58869	peroxin 2, peroxisomal targeting signal 1 receptor-like; RIKEN cDNA 1700016J08 gene [Mus musculus] 100 %
11	AB043323		52357	142372 probable guanylate kinase (EC 2.7.4.8) 1, membrane-associated, splice form b - mouse 44 %
11	NM_025681		66612	ORM1-like 3 (S. cerevisiae)
11	NM_023617	Ormd3	71724	RIKEN cDNA 1200011D03 gene
11	NM_026202		67501	acyl-Coenzyme A oxidase 2, branched chain
11	NM_053115	Acox2	93732	acyl-Coenzyme A oxidase 2, branched chain
11	NM_019542	Nagk	56174	N-acetylglucosaminase kinase
11	NM_009711	Arin	11876	antennin
11	AF232828	Nova1	18134	neuro-oncological ventral antigen 1
11	NM_011347	Selp	20344	selectin, platelet
11	AK016851		74466	ALEX3 protein
11	BC011101	Alex3	71703	ubiquitin-conjugating enzyme E2 variant 1, isoform b; DNA-binding protein [77% Homo sapiens]
11	NM_022070		98887	ribosomal protein L8
11	NM_012053	Rpl8	26961	pancreatic lipase [Homo sapiens] 55 %
11	AK007531		69166	GNAS (guanine nucleotide binding protein, alpha stimulating) complex locus
11	NM_010309	Gnas	14683	protein tyrosine phosphatase la-2beta ptd an autoantigen in insulin-dependent diabetes mellitus; phosphatase-pp pip-pp receptor
11	NM_026434		67889	RIKEN cDNA 2010004P11 gene
11	UR2439	Pipr2	19278	potassium channel modulatory factor
11	NM_019715	Pmd	74267	chromosome 11 open reading frame 10 [Homo sapiens] 100 %
11	AK007351		69038	histamine receptor H 1
11	NM_008285	Htn1	15465	neuromedin
11	NM_019515	Nmu	56183	steroid sensitive gene 1
11	AK011256	Ssg1	87896	small nuclear ribonucleoprotein D3
11	NM_026095	Srpd3	87332	RIKEN cDNA 2410012H22 gene
11	AK010472		69747	sarcoglycan, alpha (dystrophin-associated glycoprotein)
11	NM_009161	Sgca	20391	hypothetical protein MGC2550 (84% human)
11	AK003661		68520	RIKEN cDNA 1500031J01 gene
11	NM_026218		67529	methyltransferase Cyt19
11	AK006571	Cyt19	57344	RIKEN cDNA 2310032D16 gene
12	AK009137		74182	src homology 2 domain-containing transforming protein D
12	NM_009168	Shd	20420	polymerase (RNA) II (DNA directed) polypeptide 1
12	AK012635	Polr2i	69920	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3
12	AK006243	Ndu53	66091	mesenchymal stem cell protein DSC54 [92.03% Homo sapiens]
12	AK017262		71373	transcription elongation regulator 1 (CA150)
12	NM_019512	Tcerg1	56070	isoprenylcysteine carboxyl methyltransferase
12	AF209926	Icm1	57295	progesterone membrane binding protein [73% Homo sapiens]
12	AK014543		70804	prolactin integration site 1
12	NM_008842	Pim1	18712	glycophila myeloblastic kinase, B15
12	NM_032418	Dm15	13400	G protein-coupled receptor 81
12	NM_019637	Gpr91	84112	phosphoserine/threonine/tyrosine interaction protein
12	NM_032400	Slyr	56291	chaperonin-like protein
12	NM_030265	Calp	80334	calretinin alpha 1
12	NM_009818	Calna1	12385	TAF11 RNA polymerase II, TATA box binding protein (TBP)-associated factor
12	BC005603	Tef11	68776	carboxyl ester lipase
12	NM_009885	Cel	12613	RIKEN cDNA 1200006M05 gene
12	AK004618		74106	myeloid cell leukemia sequence 1
12	NM_008562	Mcl1	17210	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
12	NM_030750	Sgpp1	81535	RIKEN cDNA 1200017A24 gene
12	NM_008413	Jak2	16452	Mus musculus 15 days embryo embryonic body below diaphragm cDNA, RIKEN full-length enriched library, clone:8230401J17 product: hypothetical protein, full insert sequence
12	NM_028765		74146	KLKc_HUMAN kallikrein 12 precursor (kallikrein-like protein 5) (KLK-L5) 70 %
12	AK020228		77550	solute carrier family 30 (zinc transporter), member 6
12	AK006513		66239	myeloid ectopic viral integration site-related gene 2
12	AK006517		63511	trivalent cation tolerant protein CUTA [Homo sapiens] 81 %
12	BC005753	Sic30a6	210148	tripartite molli protein 34
12	NM_008627	Mrg2	17537	
12	AK002828		67675	
12	NM_030684	Trim34	94094	

Figure 13-6

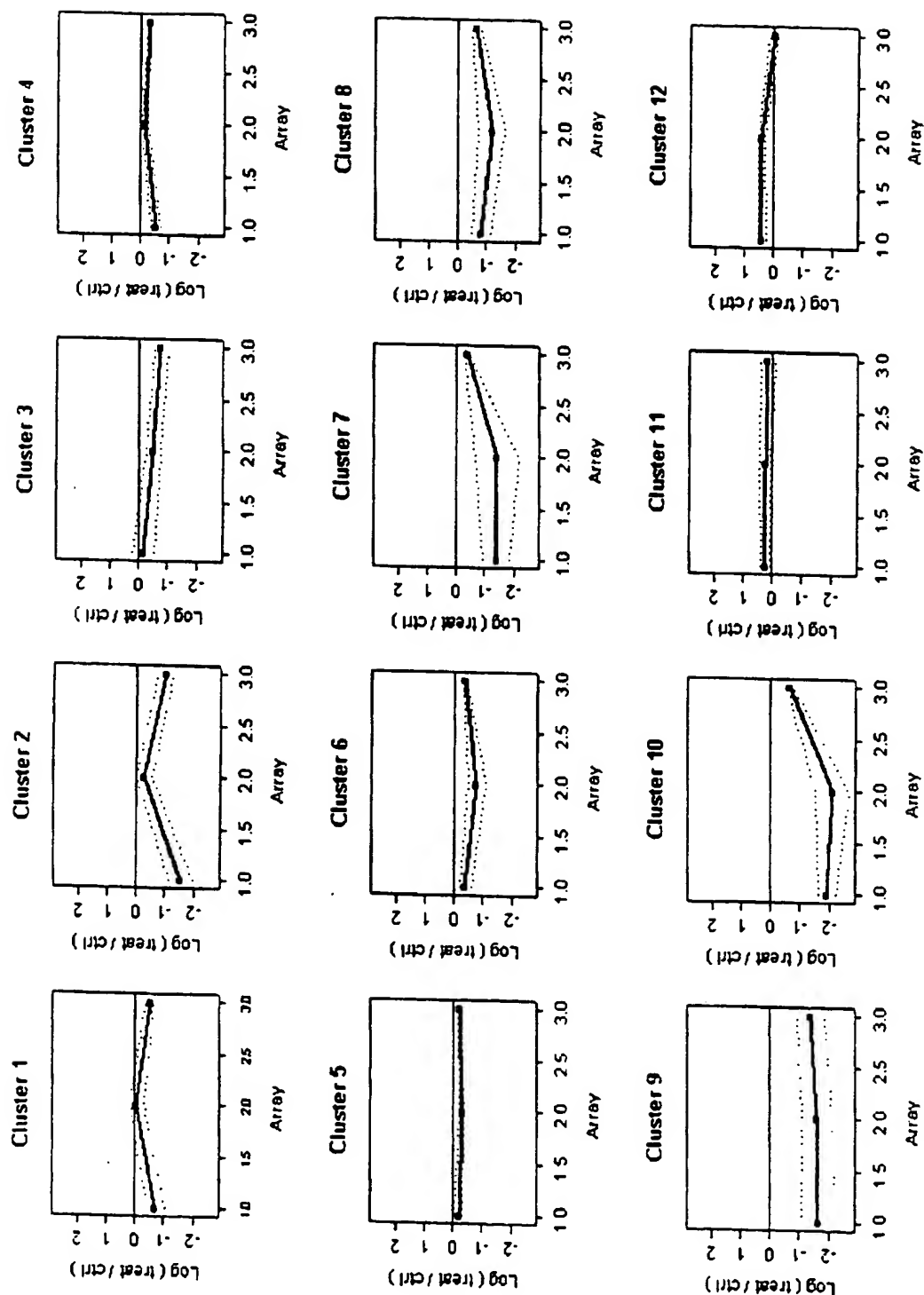


FIGURE 14-1

cluster analysis I
colon cancer
striatum

Cluster Access	Locus	Gene	Description
1 NM_020025	26878	B3galt2	udp-gal:betaglcnac beta 13-galactosyltransferase polypeptide b3galt2
1 NM_011408			
1 NM_016880	53617	Krt1-24	hair keratin acidic 5 ha5
1 AK014408	74315		patched related protein translocated in renal cancer [28.14% Homo sapiens]
1 NM_019774	56399	Akap8	A kinase (PRKA) anchor protein 8
1 NM_013529			
1 BC005625			
1 NM_030750	81535	Sgpp1	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
1 AF264049			
1 NM_010340	14785	Gpr50	G-protein-coupled receptor 50
1 AK016419			
1 AF285178	18351	Ipp	actin-binding protein mipp
1 AK017880			
1 AK019493	75735	Pank1	pancreatic kinase 1
1 NM_016788	51789	Trk2	tyrosine kinase, non-receptor, 2
1 NM_007928	13728	Mark2	MAP/microtubule affinity-regulating kinase 2
1 NM_019544	56184	Misgn1	pMesogenin1; mesogenin [Mus musculus] 100 %
1 AK017242			
1 BC003298			
1 BC010539			
1 NM_026495	67991		RIKEN cDNA 0610020102 gene
1 NM_008697	18080	ninein	ninein
1 AY028606	114566	Krt2-20	ref:NP_149022.2 - keratin, hair, basic, 2; hard keratin, type II, 2 [Homo sapiens] 85 %
1 NM_010083	13426	Dncl1	dynein cytoplasmic intermediate chain 1
1 NM_026570	64050	Gsa41	glioma-amplified sequences-41
1 NM_009212	20589	Ighmbp2	immunoglobulin mu binding protein ighmbp2
1 NM_011427	20613	Snai1	snail homolog drosophila
1 NM_008393	16373	Trx3	iroquid homeobox protein 3
1 AK009177	70088		Similar to hypothetical protein FLJ11730 [97% Homo sapiens]
1 AK010201	69687		CGI-127; yippee protein [100% Human]
1 AK002546	66058		hepatocellular carcinoma-associated antigen 112 [55% Homo sapiens]
1 NM_010080	13517	Dspp	dentin sialophosphoprotein
1 AK018594	68145		ref:NP_061875.1 - ETAA16 protein [Homo sapiens] 48 % /
1 AK002747	71685		hypothetical protein FLJ12691 [81% Homo sapiens]
1 AK020207			
1 NM_011519	20969	Sdc1	syndecan 1
1 AJ293897			
1 NM_007619	12402	Cbl	c-cbl proto-oncogene
1 AK004206	67282		AD16_HUMAN Protein AD-016 (Protein CGI-116) (x0009) 90 % /
1 NM_013696	22045	Trhr	thyrotrophin-releasing hormone receptor trh-r; thyrotropin releasing thr
1 NM_012043	26968	Islr	immunoglobulin superfamily containing leucine-rich repeat
1 NM_033374			
1 NM_007706			
1 AJ237585	54392	Hcapg	chromosome condensation protein G
1 AK014783	73914	Irak3	interleukin-1 receptor-associated kinase M [73% human]
1 NM_011017	18408	Slc25a15	solute carrier family 25 mitochondrial carrier ornithine transporter member 15 slc25a15
1 NM_018827			
1 NM_011665			
1 AK009836			
1 AK017809			
1 NM_026580	68149		ubiquitin-specific protease otubain 2 (84%)
1 AJ133536	20955	Sybl1	synaptobrevin like 1

FIGURE 14-2

Cluster Access	Locus	Gene	Description
1 AF162781			
2 NM_010231	14261	Fmo1	flavin containing monooxygenase 1
2 NM_009358			
2 AK009532			
2 AK003234			
2 NM_018808	81489	DnaJb1	DnaJ (Hsp40) homolog, subfamily B, member 1
2 NM_019503	56188	Fxyd1	FXYD domain-containing ion transport regulator 1
2 NM_027702			
2 NM_007881	13498	Drip1	dentatorubral pallidolysian atrophy
2 NM_008589	17293	Mesp2	mesoderm posterior 2 mesp2
2 NM_007658	12530	Cdc25a	cdc25a cdc25m3
2 NM_023805			
2 NM_008639	17773	Mlnr1a	mel-1a melatonin receptor
2 BC011109			
2 NM_023537	69508	Rab3b	RAB3B, member RAS oncogene family
2 AK007262			
2 NM_023644			
2 AK004775	74121		acyl-Coenzyme A oxidase 3, pristanoyl; pristanoyl-CoA oxidase [Mus musculus] 31 %
2 NM_025592			
2 AK015845			
2 NM_007581	12297	Caenb3	calcium channel, voltage-dependent, beta 3 subunit
2 NM_033327			
2 AB041586	76454		T17239 hypothetical protein DKFZp434B027.1 - human (fragment) 85 %
2 NM_007471	11820	App	amyloid beta protein precursor beta-amyloid; hippocampal
2 AK013379	78771		hypothetical protein FLJ22344 [85.6% Homo sapiens]
2 NM_021323	57775	Usp29	ubiquitin specific protease 29
2 NM_009640	11600	Agpl	angiopoietin
2 NM_008664	17930	Myom2	myomesin 2 myom2
2 NM_007793	13014	Csib	cystatin B
2 NM_020518	57276	Ctcl	cortical thymocyte receptor (X. laevis CTX) like
2 NM_023850			
2 NM_025963	67097		2113200G ribosomal protein S10 (98% human)
2 AK013108	76917		Mouse 10, 11 days embryo whole body cDNA, RIKEN full-length enriched library, clone 2810417J12 product: hypothetical
2 NM_008621			
3 AK006904	76992	Mpv17	adult male testis riken cdna clone:1700066j24
3 NM_008622	17527		mpv17
3 AK006257	69371		adult male testis riken cdna clone:1700023a16
3 AK008516			
3 AK011730			
3 NM_009215	20604	Smsl	preprosomatostatin
3 BC002240	66310		clone mgc:7522
3 NM_007421			
3 U70139			
3 AK012931			
3 AJ401461			
3 NM_025331			
3 NM_019878	56362	Sult1b1	sulfoltransferase sult1b1 washu-hhmi est genbank accession number aa267283; dopa/tyrosine
3 U37501	16776	Lama5	laminin alpha-chain lama5 basal lamina/basement membrane component
3 NM_030744	76378	Rppn	ropporin loc81026
3 AK007700			
3 AK014595			
3 AK013037			

FIGURE 14-3

cluster analysis I
colon cancer
striatum

Cluster Access	Locus	Gene	Description
3 NM_016884	15381	Hnrpc	heterogeneous nuclear ribonucleoprotein c hnrpc
3 AK014334	70770		POL2_MOUSE Retrovirus-related POL polyprotein [Contains: Reverse transcriptase; Endonuclease] (32 % M.musculus)
3 NM_009604	11449	Chrng	cholinergic receptor nicotinic gamma polypeptide chrng; muscle acetylcholine gamma-subunit
3 AB000121			
3 AK011555			
3 NM_054097	117150	pip5k2c	phosphatidylinositol-4-phosphate 5-kinase, type II, gamma
3 NM_013541			
3 NM_025380			
3 AK014579			
3 AK003384			
3 NM_025937			
4 AK014438	67111		Similar to PLT_HUMAN Protein PLT 81%.
4 NM_028605	73682	Rab36	A44492 probable DNA/RNA-binding protein - rat 55 %
4 AK018269	76877	Trp120b	RAB36, member RAS oncogene family
4 AK012416	67088	Treh	TBP-interacting protein b
4 NM_021481	58866		Trehalase (brush-border membrane glycoprotein)
4 BC005705			
4 NM_013908	30839	Fbxw5	F-box and WD-40 domain protein 5
4 NM_016675	12738	Cldn2	claudin 2
4 NM_020271	57028		hypothetical protein, MNCb-4193
4 AK021365	77988	Grifin	galactin-related inter-fiber protein (sp:P56470 - LEG4_HUMAN Galactin-4) (Lactose-binding lectin 4) (L-36 lactose binding protein)
4 NM_022993	65107	Lrp10	lrp9 low-density lipoprotein receptor-related protein 9
4 AK008069	69870		RIKEN cDNA 2010003119 gene
4 NM_022315	64074	Smoc2	SPARC related modular calcium binding 2
4 NM_008657	17878	Myf6	myf-6
4 AK016701	74430		gene trap locus 3 (27% M.musculus)
4 NM_019781	56273	Pex14	peroxisomal biogenesis factor 14 - PE_XE_MOUSE Peroxisomal membrane protein PEX14 (Peroxin-14) PEX1 100 %
5 AK021342	77867		RIKEN cDNA D730045B01 gene
5 NM_031247	83408	Ian4	Immune associated nucleotide ian4
5 BC004803			
5 NM_025397	66172		RIKEN cDNA 1110030J09 [Mus musculus] 100 %
5 AK021056	77314		sp:P46096 - SYTT_MOUSE Synaptotagmin I (Sytl) (p65) p65 38 %
5 NM_025435			
5 AK009247			
5 BC003289			
5 NM_007859			
5 AK049954			
5 AK010002	69668		RIKEN cDNA 2310061I09 gene
5 NM_053194	101489	Al114950	synembryn
5 NM_008075	14408	Gabbr1	gamma-aminobutylic acid receptor rho 1 subunit ionotropic gaba
5 NM_023380	67742	Samsn1	SSN1_MOUSE SAM-domain protein SAMS1 (SAM domain, SH3 domain and nuclear localisation prote 100 %
5 AK015616	74953		JC4194 lanosterol synthase (EC 5.4.99.7) - human 84 %
5 NM_008418	16491	Kcna3	polassium voltage-gated channel, shaker-related subfamily, member 3
5 NM_022305	14595	B4gal11	UDP-Gal4betaGalNAc beta 1,4- galactosyltransferase, polypeptide 1
5 NM_031385			
5 NM_053011	94217	Lrp1b	low density lipoprotein-related protein 1B (deleted in tumors)
5 AK018759	66943		hypothetical protein FLJ22378 (81% human)
5 NM_016689	11828	Aqp3	aquaporin
5 NM_007442	11695	Alx4	aristaless 4
5 NM_019942	56526	38961	seplin 6
5 NM_010582	16425	Iih2	inter-alpha trypsin inhibitor, heavy chain 2
5 AK018624	71581		RIKEN cDNA 9130015A21 gene

FIGURE 14-4

cluster analysis I
colon cancer
striatum

Cluster Access	Locus	Gene	Description
5 NM_023423			
5 NM_026415			
5 NM_026387			
5 U11822	67769	Cdk7	cyclin-dependent kinase 7 (homolog of Xenopus MO15 cdk-activating kinase)
5 AF358257	12572		T46611 CL2BB protein - rat (31 % R.norvegicus)
5 NM_028717	70967	Als2	amyotrophic lateral sclerosis 2 (juvenile) homolog (human)
5 AK015359	74018		
5 M13016			
5 NM_025596			
5 NM_018815	54563	Nup210	nuclear pore membrane glycoprotein 210 pom210
5 L08074	14912	Nkx6-2	NKG transcription factor related, locus 2
6 NM_030690	75646		DKFZP564G013 protein; novel retinal pigment epithelial gene; novel retinal pigment epithelial gene 84 %
6 NM_028311	72651		hypothetical protein FLJ21168 [76% Homo sapiens]
6 AK013364	72836		Similar to protection of telomeres 1; DKFZP566D211 protein [71% Homo sapiens]
6 NM_028104	72112		PKC-dependent PP1 inhibitory protein subunit 14 [Mus musculus] 100 %
6 NM_008352	21749	Terf1	telomeric repeat binding factor 1
6 NM_008382	16326	Inhbe	defense/immunity protein activity, indoleamine-pyrrole 2,3-dioxygenase activity
6 NM_033476	21422	Tcfcp2	alpha-globin transcription factor cp2
6 AK010800	76797		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
6 NM_010940	18192	Nsccn1	non-selective cation channel 1
6 NM_022024	63986	Gmfg	glia maturation factor, gamma
6 NM_010882	17984	Ndn	neodin
6 NM_011705	22367	Vrk1	vaccinia related kinase 1
6 NM_029659	76571	Abog2	map kinase phosphatase-like protein MK-STYX [Homo sapiens] 84 %
6 AK015374	74653		ATP-binding cassette, sub-family G (WHITE), member 2
6 NM_011432	20630	Snrp1c	hypothetical protein FLJ23356 [Homo sapiens] 81
6 AK014934	70887		U1 small nuclear ribonucleoprotein 1C
6 NM_020578	57440	Ehd3	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921520P21 product:hypothetical Microbodies C-terminal targeting signal containing protein
6 NM_011154	19054	Ppp2r3a	EH-domain containing 3
6 AK012224	76795		protein phosphatase 2 (formerly 2A), regulatory subunit B, alpha
6 NM_013652	20303	Ccl4	vascular Rab-GAP/TBC-containing; BUB2-like protein 1 [Mus musculus] 48.54 %
6 AK016890	71099		chemokine (C-C motif) ligand 4
6 AF052942	13143	Dapk2	serine/threonine kinase FKSG81 [Homo sapiens] 44 %
6 NM_033561			death-associated kinase 2
6 AK010577	76559		Similar to hypothetical protein FLJ10242 [95% Homo sapiens]
6 NM_008609	17388	Mmp15	matrix metalloproteinase 15
6 NM_009325	21390	Tbia2r	thromboxane a2 receptor
7 AB041649			
7 AK012378			
7 AK017779			
7 AK008940	70163		Mouse 8 day embryo whole body cDNA, RIKEN full-length enriched library, clone:5730519L10 product:myristoylated alanine rich protein kinase C substrate
7 NM_054039	20371	Foxp3	Similar to A43932 mucin 2 precursor, intestinal - human (fragments) 27 %
7 NM_025798			FXP3_MOUSE Forkhead box protein P3 (Scurfin) 100 %
7 AK015001	66733		
7 NM_011248	19649	Rbig1	Similar to potassium voltage-gated channel, subfamily G, member 1; potassium channel KH2 [78% Homo sapiens]
7 NM_007900	13605	Ecl2	retinoblastoma inhibiting gene 1
7 NM_019759			ect2 oncogene
7 AK019494	78261		
7 NM_033567	94047	Cecr6	Mouse 0 day neonate skin cDNA, RIKEN full-length enriched library, clone:4632413E21::weakly similar to rat phospholipase B
7 NM_009315	21343	Taf6	cat eye syndrome chromosome region, candidate 6 homolog (human)
7 AK013700	73001		TAF6 RNA polymerase II, TATA box binding protein (TBP)-associated factor
			RIKEN cDNA 2900055J20 gene

FIGURE 14-5

Cluster	Access	Locus	Gene	Description
7	NM_008055	14366	Fzd4	frizzled homolog 4 drosophila fz4
7	AK014404	74014		RIKEN cDNA 3732407C23 gene
7	NM_008782	18507	Pax5	paired box 5 gene 5
7	NM_007825	13123	Cyp7b1	10 11 days embryo riken cdna clone:281040711; cytochrome p450 7b1 cyp7b1
7	NM_009050	19713	Ret	c-ret proto-oncogene
7	AK004137	54364	Rnasep2	18 days embryo riken cdna clone:1110037d03
7	NM_011750	22668	Zip162	zinc finger protein 162
7	AK008922	67112	Fgl22	fibroblast growth factor 22
7	NM_019516	56072	Lgals12	lectin, galactose binding, soluble 12
7	NM_013922	30944	Zip354c	zinc finger protein 354c
7	NM_030711	80898	Arts1	type 1 tumor necrosis factor receptor shedding aminopeptidase regulator
7	NM_016756	12566	Cdk2	cyclin-dependent kinase 2 [Mus musculus] 100 %
7	NM_011109	17782	Pla2g2d	phospholipase A2, group IID
8	AK014667	74577		hypothetical protein MGC10771 [78% Homo sapiens]
8	AK008003	72045		RIKEN cDNA 2010001E11 gene
8	AK015893	75823		Mouse adult male testis cDNA, RIKEN full-length enriched library, clone:4930525F21 product:hypothetical
8	NM_011216	19277	Pipr0	protein tyrosine phosphatase, receptor type, O similar to hypothetical protein FLJ10008 [Homo sapiens]
8	BC002230			
8	AK016572			
8	AK009020			
8	AK014983	77058		
8	NM_013813	13823	Epb4.1l3	Mouse adult male testis cDNA, RIKEN full-length enriched library, clone:4921530D09 product:hypothetical
8	NM_033073	110661	D15Wsu77e	erythrocyte protein band 4.1-like 3 adult male kidney riken cdna clone:0610009o09
8	AK007269			
8	AJ276690	192120	Bsry	B-box and SPRY domain containing
8	AF127245	20591	Smcx	smcx selected cdna on the x
8	AK016497	70980		RIKEN cDNA 4931431F19 gene
8	NM_011446	20680	Sox7	sry-box containing 7 sox7
8	AK016148	75342	Pax2	RIKEN cDNA 4930556J24 gene
9	X55781	18504		paired box gene 2
9	AK018496	66817		9030409E16Rik RIKEN cDNA 9030409E16 gene
9	AF158744	67310	Prlpc2	prolactin-like protein C 2
9	AK005970	75502		RIKEN cDNA 1700013O04 gene
9	AK015565	75803		RIKEN cDNA 4930473B18 gene
9	BC005523	192167	Nlgn1	neuroligin 1
9	NM_007770	12951	Crx	homeodomain protein crx homeobox
9	NM_030701	80885	Puma-g	putative seven transmembrane spanning receptor puma-g
9	AK014840	70821		RIKEN cDNA 4921507P07 gene
9	AK019700	67712	Mscp	mitochondrial solute carrier protein
9	AK017110	74482	Mit4	interferon induced transmembrane protein 4 like
9	AK002512	56060		putative nuclear protein ORF1-FL49 [Homo sapiens] 89.42
9	AK007235			Mouse adult male testis cDNA, RIKEN full-length enriched library, clone:1700122C07 product:serine/threonine kinase 33,
9	NM_010610	16531	Kcnma1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1
9	NM_011999	26888	Clec3f6	C-type (calcium dependent, carbohydrate recognition domain) lectin, superfamily member 6
9	AB059565	105349	Akr1c18	aldo-keto reductase family 1, member C18
9	NM_010671	16699	Krtap13	keratin associated protein 13
9	NM_026271			
9	NM_011626	21982	Tpar1	TPA regulated locus
9	AK011231	72068	Cnot2	CCR4-NOT transcription complex, subunit 2
9	AK003420	68567		cell growth regulatory with EF-hand domain [Homo sapiens]
9	NM_020515	57272	Ora16	gene for odorant receptor A16

FIGURE 14-6

Cluster Access	Locus	Gene	Description
9 AK015473	70952		KIAA1074 protein [Homo sapiens] 45.33 %
9 NM_024442	70101	Cyp4116	cytochrome P450, family 4, subfamily 1, polypeptide 16
9 AK015021	70954		adult male testis riken cdna:4922502b01
9 NM_009334	21419	Tcfap2b	transcription factor ap-2 beta tcfap2b
9 AK017430	71388		10 days neonate head riken cdna clone:5S30401a14
9 AK014850	70859		RIKEN cDNA 4921509B22 gene
9 BC003810	68775	Alp6v1c2	ATPase, H+ transporting, V1 subunit C, isoform 2
9 AK006956	73533		RIKEN cDNA 170080G18 gene
9 NM_013706	23833	Cd52	CD52 antigen
9 NM_007892	13559	E2f5	e2f transcription factor 5 clone mgc-6043; e2f-5 protein
9 AK014851	70897		hypothetical protein MGC26988 (38% human)
9 NM_023784	75581		RIKEN cDNA 2310016N21 [Mus musculus] 100 %
9 NM_011165	19110	Prp4	prolactin-like protein A
9 AK015697	75040		RIKEN cDNA 4930504H06 gene
9 NM_010832	17692	Msl31	male-specific lethal-3 homolog 1 (Drosophila)
9 AK009111	56784	Tulp1	tuberlin-like protein 1
9 AK009853	76968		RIKEN cDNA 2310046K23 gene
10 AK009636	69585		adult male tongue riken cdna clone:2310039I15
10 NM_054066	114875	Picz1	phospholipase C, zeta 1
10 NM_010934	18166	Npy1r	neuropeptide y receptor y1
10 AF133300	209102	mor17-1	olfactory receptor mor17-1
10 AK003826	68530		RIKEN cDNA 1110019L22 gene
10 NM_026338	67722		RIKEN cDNA 4921517D21 gene
10 NM_010210	14198	Fh1t	fragile histidine triad gene
10 NM_010735	16992	Lta	lymphotoxin A
10 NM_009228	20648	Snla1	synaptolin, acidic 1
10 AK016310	15269	Hist4	adult male testis riken cdna clone:4930578d05
10 AK014278	71818		RIKEN cDNA 3200001D21 gene
10 AB036341	18821	Pin	Mus musculus mRNA for CN 8 scFv, complete cds
10 NM_023129	66320		phospholamban [Mus musculus] 100 %
10 NM_025486	20391	Sgca	RIKEN cDNA 1700006C06 [Mus musculus] 100 %
10 NM_009161	74902		sarcoglycan, alpha (dystrphin-associated glycoprotein)
10 AK015166	74902		pleclin 1, intermediate filament binding protein, 500kD [Homo sapiens] 25.74 %
10 NM_023718	28254	Slc21a13	solute carrier family 21 (organic anion transporter), member 13
10 D26047	18700	piga	phosphatidylinositol glycan, class A
10 AK020544	77363		RIKEN cDNA 9530004P13 gene
10 NM_013616	18365	Olfr64	olfactory receptor 64
10 NM_018780	54612	Sirp5	secreted frizzled-related sequence protein 5
10 AK013060	17281	Fyco1	FYVE and coiled-coil domain containing 1
10 NM_024169	66120	Fkbp11	FK506 binding protein 11
11 NM_030611	83702	Akr1c6	Akr1c6
11 NM_032542	84543	Sval2	seminal vesicle antigen-like 2; SLP in the mammary gland; SVA-like protein in the mammary gland [Mouse 100 %]
11 NM_018579	56217	Mpp5	membrane protein, palmitoylated 5 [MAGUK p55 subfamily member 5]
11 M26156	14990	H2-M2	histocompatibility 2, M region locus 2
11 NM_009500	22325	Vav2	vav2 oncogene
11 AK014939	70885		hypothetical protein FLJ10569 [100% human]
11 AK004632	74105	Gga2	golgi associated, gamma adaptin ear containing, ARF binding protein 2
11 AK009563	74182		RIKEN cDNA 2310032D16 gene
11 NM_027719	71202		RIKEN cDNA 4933436E20 [Mus musculus] 100 %
11 BC011108	71699		hypothetical protein FLJ20473 [Homo sapiens] 69 %
11 NM_009286	20865	Sh2	sulfolipase, hydroxysteroid preferring 2
11 NM_008536	17112	Tm4sf1	transmembrane 4 superfamily member 1

FIGURE 14-7

cluster analysis I
colon cancer
striatum

Cluster Access	Locus	Gene	Description
11 AK014760	75770		RIKEN cDNA 4833424K13 gene
11 AK009351	69563		RIKEN cDNA 2310015B20 gene
11 AK014968	70918		RIKEN cDNA 4921525L17 gene
11 AK021026	77849		RIKEN cDNA B430319H21 gene
11 AK017781	24051	Sgcb	days embryo niken cdna clone:573052122
11 NM_007950	13874	Ereg	epiregulin
11 NM_023455	68396	Cml4	putative N-acetyltransferase Camello 4; RIKEN cDNA 0610037O16 gene [Mus musculus] 100 %
11 AK006680	73347		CLD2_MOUSE CLAUDIN-2 23 %
12 AK007494	69064		RIKEN cDNA 1810014F10 gene
12 AK019498	15507	Hsp25	day neonate skin niken cdna clone:4632415I09
12 AK012248	72322	Xpo5	exportin 5
12 AF242377	170763		Z208_HUMAN Zinc finger protein 208 53 %
12 AF090691	13012	Csl8	cystatin 8 (cystatin-related epididymal spermatogenic)
12 NM_030691	80719	Igsf6	immunoglobulin superfamily member Igsf6
12 AF320615			Mus musculus Trf receptor-associated factor 3 (Traf3) gene, partial sequence; amnionless precursor protein (Amn) gene
12 AK007707			
12 AK005311			
12 AK014062			
12 NM_013845	26563	Ror1	receptor tyrosine kinase-like orphan ror1 - ROR1_MOUSE Tyrosine-protein kinase transmembrane receptor ROR1
12 AK015972	75137		hypothetical protein FLJ10656 (35% human)
12 NM_010635	16596	Kir1	Kruppel-like factor 1 (erythroid)
12 NM_011884	24018	Rngit	RNA guanylyltransferase and 5-phosphatase
12 NM_008085			
12 NM_030726	80978	Gpr90	G protein-coupled receptor 90
12 AK007281	76998		
12 AK002769	71683		glycophorin C, isoform 2 (Homo sapiens) 68 %
12 NM_022408	27886	Es2el	embryonic lethal - Es2 protein; DNA segment, Chr 16, human D22S1269E, expressed [Mus musculus] 100 %
12 NM_013463	11605	Gla	galactosidase, alpha
12 AF133300	209102	mor17-1	olfactory receptor mor17-1
12 AF333770	170571	Cnlnap4	contactin associated protein 4
12 AK007346	73608		similar to RIKEN cDNA 1810008A16 gene [Homo sapiens] 84 %
12 NM_008866	18777	Lypla1	lysophospholipase 1
12 NM_010234	14281	Fos	c-fos cellular homolog to viral oncogene c-fos protein
12 AK014845	70844		RIKEN cDNA 4921508M14 gene
12 AK004956	71758		T00335 hypothetical protein KIAA0564 - human (fragment)(89% human)
12 NM_025675			
12 BC006699	72169	Trim29	10 11 days embryo niken cdna clone:2810431n19; clone image:3498575
12 AK015864			
12 AK006382	75547		RIKEN cDNA 1700026G02 gene
12 AK014485			
12 NM_009410	21975	Top3a	topoisomerase (DNA) III alpha
12 NM_019515	56183	Nmu	neuromedin
12 AK016159	75308		RIKEN cDNA 4930557B21 gene
12 NM_009792			
12 AK015780	74717		B59254 myosin heavy chain 12, splice form2 - human 29 %
12 NM_009475	22264	Upa	uterine-specific proline-rich acidic protein
12 NM_008256	15374	Hnl	hematological and neurological expressed sequence 1
12 M36516	22690	Zfp28	zinc finger protein mkr5 3 end
12 AK014391			

Figure 14-8

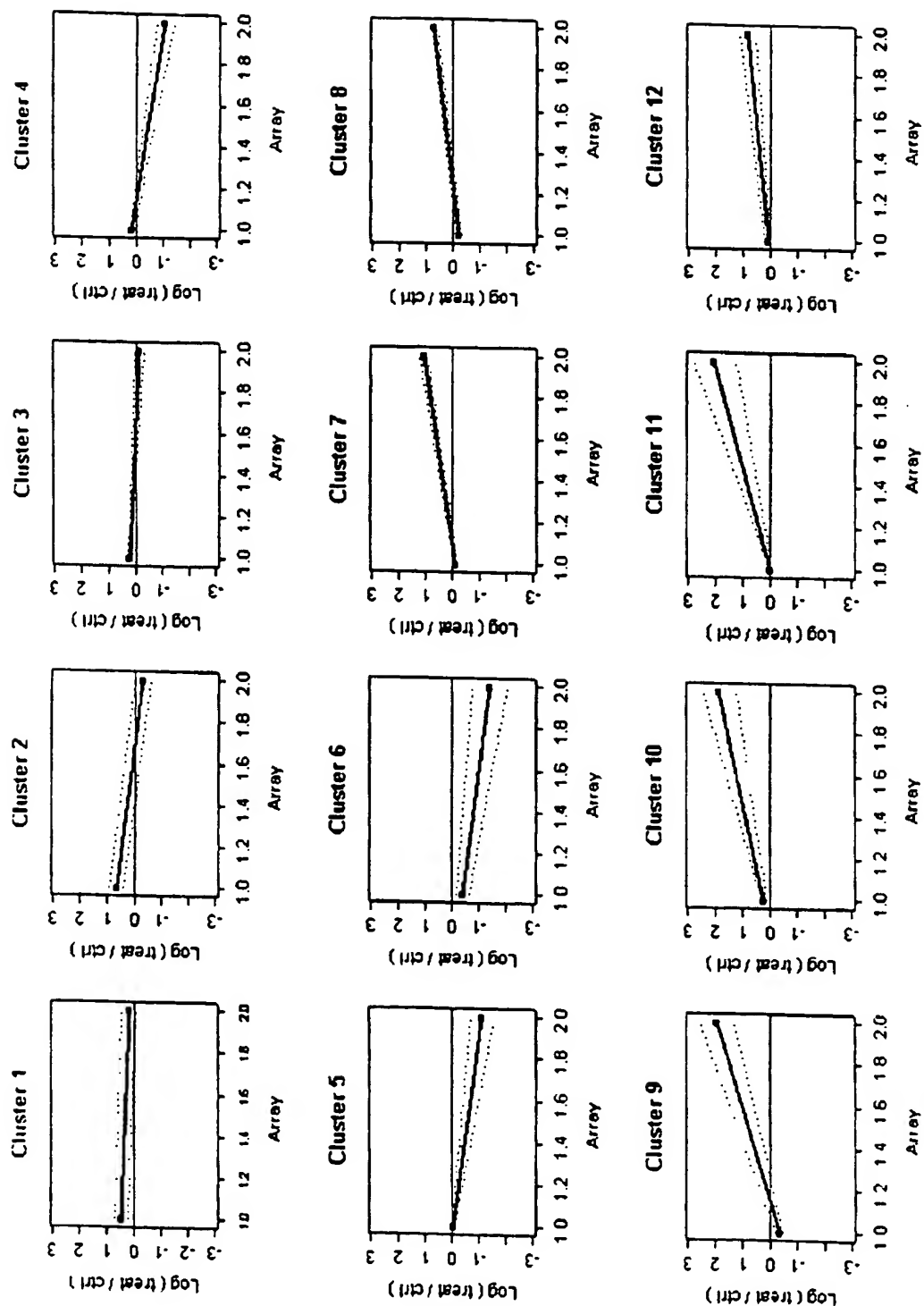


FIGURE 15-1

cluster analysis II
colon cancer
striatum

Cluster	Access	Locus	Gene	Description
1	NM_008060	19733	Rgn	regucalcin
1	AK012535	101513		expressed sequence A1256456
1	NM_009699	11827	Aqp2	aquaporin 2
1	AF233580	107392	Brrs1	breast cancer metastasis-suppressor 1
2	NM_010351	14836	Gsc	goosecoid gsc
2	NM_027170	69696		JC6547 high sulfur protein B2E - rat 37 %
2	NM_009814	12373	Casq2	calsequestrin 2
3	NM_007986	14089	Fap	fibroblast activation protein
3	AK009387	69578		RIKEN cDNA 2310016G11 gene
3	NM_011054	18575	Pde1c	phosphodiesterase 1C
3	AK012664	69922	Vrk2	vaccinia related kinase 2
3	NM_010863	17912	Myo1b	myosin IB
4	AF108020	14739	Edg5	endothelial differentiation, sphingolipid G-protein-coupled receptor, 5
4	NM_007574	12262	C1qg	complement component 1, q subcomponent, gamma polypeptide
4	AK018444	52504		expressed sequence A1448222
4	AK020286	77697	Mmab	methylmalonic aciduria (cobalamin deficiency) type B homolog (human)
5	NM_007734	12828	Col4a3	alpha collagen iv col4a3
5	NM_013982	29870	Gise1	G two S phase expressed protein 1
6	NM_009014	19363	Rad541	RAD51-like 1 (S. cerevisiae)
6	X98456			M.musculus ORF1 and ORF2 genes
6	L17069	214162	Mll	myeloid/lymphoid or mixed-lineage leukemia
7	AK014260	101437		hypothetical protein FLJ10694; hypothetical protein FLJ10889 [87% Homo sapiens]
7	NM_025310	56095	Epcs3	ectoplacental cone, invasive trophoblast giant cells, extraembryonic ectoderm and chorion sequence 3
8	NM_026158	67441		RIKEN cDNA 0610042E07
8	NM_011203	19248	Pltn12	protein tyrosine phosphatase, non-receptor type 12
9	NM_021416	58227		hypothetical protein, MNCb-2622
9	NM_009537	22632	Yy1	YY1 transcription factor
9	NM_010665	16670	Krt1-2	keratin complex 1, acidic, gene 2
9	NM_024412	12733	Cicnk1	chloride channel K1
10	AK006472	74239		Rab6-interacting protein 2 [Mus musculus] 23.36 %
10	NM_013483	12231	Btn1a1	butyrophilin, subfamily 1, member A1
11	X58472	16588	Kin	antigenic determinant of rec-A protein
11	NM_013720	29808	Mga	MAX gene associated
11	AK011185	72125		Similar to CGHU2V collagen alpha 2(V) chain precursor - human 30%
11	NM_008667	17936	Nab1	Ngfi-A binding protein 1
12	AK020653	78558		adult male urinary bladder riken cdna clone:9530081k03
12	AK017955	60315	Myg1	melanocyte proliferating gene 1
12	NM_021421	52477		DNA segment, Chr 1, ERATO Dsi 396, expressed - RIKEN cDNA 2610307I21; hypothetical MNCb-4273 [Mouse] 100 %
12	NM_011593	21857	Timp	tissue inhibitor of metalloproteinase 1
12	NM_008479	16768	Lag3	lymphocyte-activation gene 3

Figure 15-2

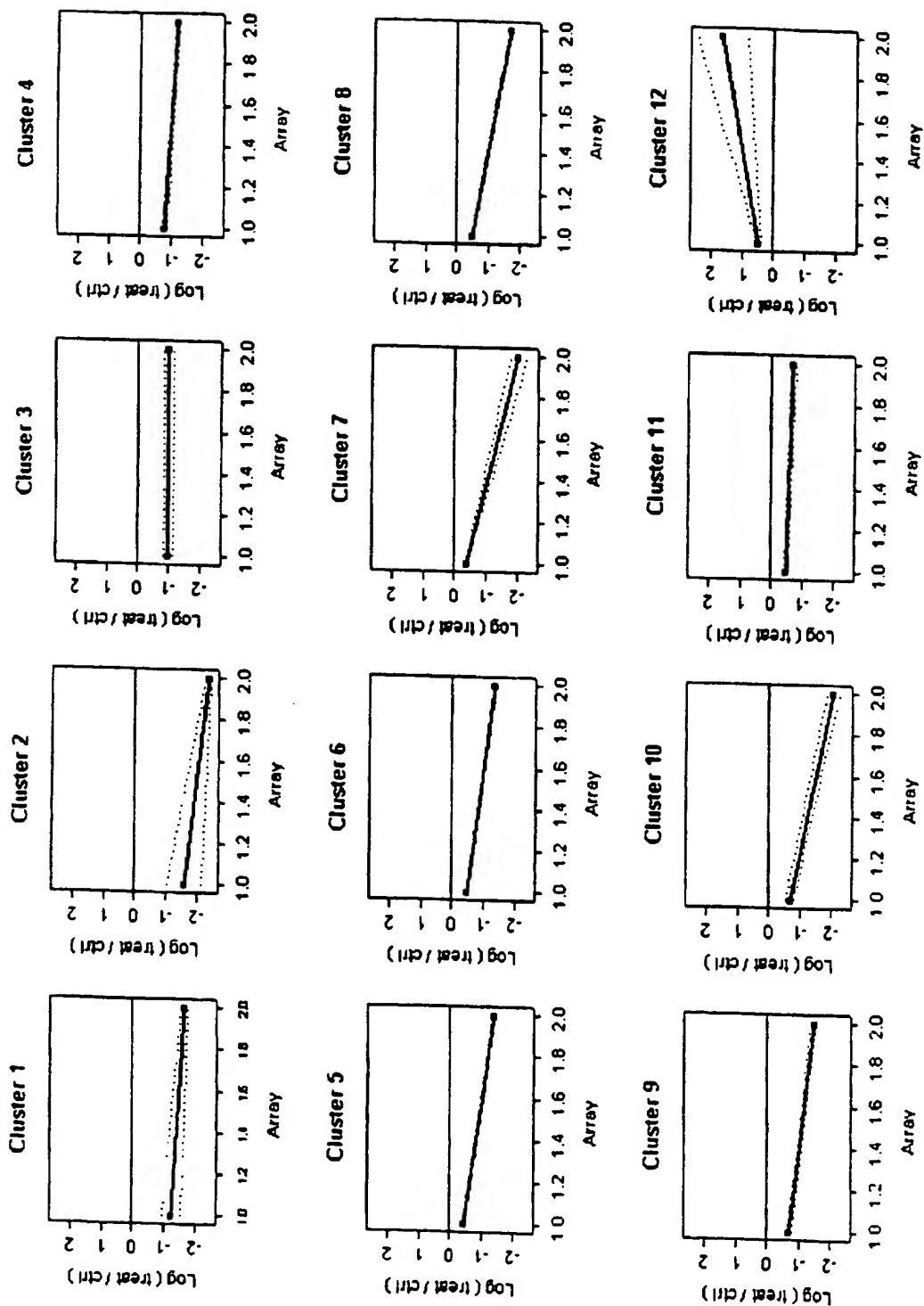


FIGURE 16-1

cluster analysis I
lung cancer
striatum

Clont Access	Locus	Gene	Description
1 AK005379	76497	Ppp1r1f	protein phosphatase 1, regulatory (inhibitor) subunit1 11
1 BC003298			
1 NM_025285	20257	Slmn2	stathmin-like 2
1 NM_010278	14581	Gri1	growth factor independent 1
1 NM_033652	110548	Lmx1a	lim homeodomain-containing transcription factor lmx 1a
1 AK011208	72135		RIKEN cDNA 2600014C22 gene
1 BC006876	68038		hypothetical protein MGC3234 [89% Homo sapiens]
1 NM_020483			
1 U91922	13211	Ddx9	rna helicase a ddx9 and drosophila mle
1 AK007246	76846		adult male testis riken cda clone:1700123x08
1 NM_013827	17765	Mif2	metal response element binding transcription factor 2
1 AK004852	13445	Cdkap1	CDK2 (cyclin-dependent kinase 2)-associated protein 1
1 NM_030729	80987	Wasbp	n-wasp binding protein wish
1 NM_010202			
1 NM_008735			
1 AK005095			
1 NM_009313	21336	Tacr1	substance p receptor
1 AK074117			
1 AK008822			
1 AK015536			
1 BC002221			
1 AK018179			
1 NM_013463	11605	Gla	galactosidase, alpha
1 NM_021292	59056	Evc	Ellis van Creveld gene homolog (human)
1 NM_009123	20231	Mks1-2	NK1 transcription factor related, locus 2 (Drosophila)
1 NM_011427	20813	Snai1	snail homolog drosophila
1 X76011			
1 AK009365			
1 NM_007666	12563	Cdh6	cadherin cdh6
1 AK016641			
2 NM_008996	19324	Rab1	RAB1, member RAS oncogene family
2 BC006063			
2 NM_023305	67123	Ubap1	ubiquitin-associated protein 1
2 AK012967	76553	ENC1	ENC1, MOUSE Ectoderm-neural cortex-1 protein (ENC-1) 80 % /
2 NM_009298	15502	Dnaj1	DnaJ (Hsp40) homolog, subfamily A, member 1
2 NM_009860	12532	Cdc25c	cell division cycle 25 homolog c.s. Cerevisiae
2 AK019388	77134		Mus musculus 12 days embryo head cDNA, RIKEN full-length enriched library, clone:3010025E17 product:HETEROGENEOUS NUCLEAR RIBONUCLEOPROTEIN A0 (HNRNP A0) homolog [Homo sapiens]
2 NM_030726	80978	Gpr90	G protein-coupled receptor 90
2 BC004773	78802		RIKEN cDNA 4930506L13 gene
2 AK016289	75894		KIAA0547 gene product [80% Homo sapiens]
2 AK018159	75308		RIKEN cDNA 4930557B21 gene
2 NM_009161	20391	Sgca	Sarcoglycan, alpha (dysglycin-associated glycoprotein)
2 AK019864	68275	Rgs1	11 days pregnant adult female ovary and uterus riken cda clone:5031405x23
2 Y07611	20875	ncf1-p14e	protein kinase C-like 1 - prostaglandin E receptor 1 (subtype EP1)
2 AK002769	71683		glycophorin C, isoform 2 [Homo sapiens] 68 %
2 NM_008621			
2 NM_024263			
2 NM_008137			
2 AK012941			
2 NM_025934			
2 BC010556	66734		microtubule-associated protein 1 light chain 3 alpha; MAP1 light chain 3-like protein 1; microtubule-associated proteins 1A/1B light chain 3 [100% Homo sapiens].
2 AK014694			
2 AK010400			
2 NM_008675	17865	Nbt1	neuroblastoma, suppression of tumorigenicity 1
2 NM_009108	20186	Nr1h4	retinoid x receptor interacting protein rnp14-1no.6 alpha isoform
2 NM_008206	15001	H2-Oa	histocompatibility 2, O region alpha locus
2 NM_023514			
2 AK012635	69920	Poi2i	polymerase (RNA) ii (DNA directed) polypeptide 1
2 NM_011851			
2 NM_011331	20293	Soya12	monocytic chemottractant protein 5 precursor mcp-5 small inducible cytokine member of the c-c chemokine family; strain sjlf a12 scya12
2 AK007195	76640		RIKEN cDNA 1700113H08 gene
2 NM_009434	22113	Tssc3	tumor-suppressing subchromosomal transferable fragment 3

FIGURE 16-2

cluster analysis I
lung cancer
striatum

Chp1 Access	Locus	Gene	Description	Gene
2 NM_021782	60505	U21	interleukin 21	
2 NM_010815	17444	Mora	monocytic adaptor	
2 AK016041				
2 AK015952	75168		adult male testis riken cdna clone:4930533b18	
2 NM_023320				
2 NM_007499	11820	Alm	albixia telangiectasia mutated in beligs atm	
2 NM_010509	15976	linar2	interferon alpha and beta receptor 2 linar2; type i linar2c	
2 BC004779	66812		RIKEN cDNA B430432M10 gene	
2 NM_031373	72075	Ogfr	opioid growth factor receptor	
2 NM_020579				
3 NM_007915	13653	E24	etoposide induced 2.4 mRNA	
3 AK003559				
3 NM_007921	13710	Ell3	E74-like factor 3	
3 DO1093	18551	Pcsk4	proprotein convertase subtilisin/kexin type 4	
3 AK003871				
3 AK008994				
3 BC017596	73094			
3 NM_009881	12593	Cdyl	chromodomain protein, Y chromosome-like	
3 NM_008302				
3 AK015017	60315	Myg1	metanocyte proliferating gene 1	
3 AK017955				
3 AK016419				
3 X81365	21367	Ctin2	catenin 2	
3 AF167573	27374		Jak-binding protein 1	
3 AK011866	72481		RIKEN cDNA 261020C22 gene	
3 BC005753	21048	Sic30a6	solute carrier family 30 (slc transporter), member 6	
3 NM_007610	12368	Casp2	caspase 2 casp2	
3 AK009217	69511		KLKc_HUMAN Kallikrein 12 precursor (Kallikrein-like protein 5) (KLK-15) 70 %	
3 NM_028562				
3 BC000331				
3 NM_008765	16393	Orc2	origin recognition complex protein homolog mrc2l orc2p yeast of replication subunit swiss-prot acces	
3 U70033	20541	Sic8a1	sodium calcium exchanger nca transmembrane protein	
3 NM_019441				
3 AF317517	77889	Lbh	limb-bud and heart	
3 NM_013521	14293	Fpr1	formyl peptide receptor 1	
3 BC005773	26558	Home3	home3 homolog 3 (Drosophila)	
3 U69898	21856	Timm44	translocase of inner mitochondrial membrane tim44 nuclear encoding protein precursor form has size 50 kd mature	
3 NM_053186				
3 NM_009745				
3 AJ304865				
3 NM_020603	231130	Trnp2	TNFAIP3 interacting protein 2	
3 NM_008300				
3 AB041660	230991		brain cdna clone mrcb-3966 unnamed protein product	
3 NM_011581	26572	Cops3	COP9 (constitutive photomorphogenic) homolog, subunit 3 (Arabidopsis thaliana)	
3 NM_029583	76371		10 11 days embryo riken cdna clone:2810408b13	
3 NM_007482	11846	Arg1	arginase 1, liver	
3 AK008844				
3 NM_010053	13390	Dhs1	distal-less homeobox	
3 AK012532				
3 NM_033374				
3 BC016444	15373	Hmx3	adult male liver riken cdna clone:1300017a15	
3 BC003954				
3 NM_008031	19648	Rbp7	retinoblastoma binding protein clone mpc-5013	
3 AK013245	72748		hypothetical protein MGC12904 (77% Homo sapiens)	
3 NM_008556	18611	Pea15	phosphoprotein enriched in astrocytes 15	
3 NM_009973	12992	Csmd	casein delta	
3 AK014534	70802		DMJA_MOUSE DNA (cytosine-5)-methyltransferase 3A (Dnmt3a) (DNA methyltransferase Mmullia) (DNA MTase 30 %	
3 AK008237	72351			
3 X06340	12560	Cdh3	cadherin 3	
3 NM_023729	74068	Gas2	germ cell-specific ankyrin, SAM and basic leucine zipper domain containing protein	
3 NM_053199	94332	Nect1	nectin-like 1	
3 NM_008116	14598	Ggip	gamma-glutamyl transpeptidase ggip	

FIGURE 16-3

Clust Access	Locus	Gene	Description
3 AK014175	73205		Mus musculus 13 days embryo head cDNA, RIKEN full-length enriched library, clone:3110043D21 product:unknown EST
3 BC003432	110842	Ello	electron transferring flavoprotein, alpha polypeptide
3 NM_021022	27413	Abcb11	ATP-binding cassette, sub-family B (MDR/TAP), member 11
3 AK011640	72183	Snv6	sorting nexin 6
3 NM_005369	21810	Tgfb1	transforming growth factor, beta induced
4 NM_009055	19724	Rfx1	regulatory factor X, 1 (influences HLA class II expression)
4 AB049650	75398	Mip32	mip32 mitochondrial ribosomal protein 132 132mt
4 NM_011883	24017	Rpl13	ring finger protein 13
4 NM_015769	50505	Erc4	exonin repair cross-complementing rodent repair deficiency, complementation group 4
4 NM_018863	68147	Nola1	nucleolar protein family A, member 1 (NAACA small nucleolar RNPs)
4 NM_026578	24001	Tiam2	T-cell lymphoma invasion and metastasis 2
4 AK002682			
4 AK003123			
4 NM_026490			
4 AF272844			
4 AF060088	26440	Psmc1	20s proteasome subunit c2 psma1 alpha-type
4 NM_016877	53621	Crot4	CCR4-NOT transcription complex, subunit 4
4 NM_013922	30944	Zfp354c	zinc finger protein 354C
4 AK005047	52575		hypothetical protein FLJ20432 [Homo sapiens]
4 NM_026305			
4 AK016900	74457		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4833424M13 product:undassifiable
4 NM_011902	24084	Tek2	teklin 2
4 NM_009301	20944	Swc5	seminal vesicle secretion 5
4 NM_013885	29876	Clec4	chondro intracellular channel 4 (mitochondrial)
4 BC004016			
4 NM_021302	57740	Ple	PKC protein kinase, hypothetical serine/threonine protein kinase [Mus musculus] 100 %
4 NM_019834	26431	Glt2	Glt2_MOUSE ARF-GTPase-activating protein Glt2 (G protein-coupled receptor kinase-interactor 2) (Tyr 100 %
4 AK014500	77047		Similar to cytoplasmic dynein heavy chain 2 [B9% Rattus norvegicus]
4 AK007884	66229		RL7_HUMAN 60S ribosomal protein L7 51 %
4 NM_008520	16998	Ltbp3	latent transforming growth factor beta binding protein 3
4 NM_016981	20544	Sic3a1	solute carrier family sodium/hydrogen exchanger member slc3a1; clone image:3500839
4 NM_031376	83490	Bcap	b cell phosphoinositide 3-kinase adaptor bcap
4 NM_011377	20465	Sim2	single-minded 2
4 AK005541	72026		Similar to TRMU_HUMAN tRNA (5-methylaminomethyl-2-thiouridylyl)-methyltransferase human 89 %
5 NM_021328			
5 V00711			
5 BC011091	109815	H447	histocompatibility 47
5 NM_007356			
5 AK009120			
5 AK014760	75770		RIKEN cDNA 4833424K13 gene
5 AF117340	26401	Map3k1	mitogen activated protein kinase kinase kinase 1
5 AK004878			
5 AK010328	69702	Nduaf1	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, assembly factor 1
5 AK010648	70024		Similar to MCM10 minichromosome maintenance deficient 10 (S. cerevisiae) [81% Homo sapiens]
5 AK017580			
5 NM_025633	66559	Metap1	methionine aminopeptidase-like 1
5 NM_027149	69641		A49364 59 protein, brain - human (fragment) 70 %
5 NM_026239	67564		hypothetical protein FLJ14084 (87 % human)
5 NM_021386	58187	Cldn10	claudin-10
5 AK008955	70397		Similar to hypothetical protein FLJ20533 [68% Homo sapiens]
5 NM_010497	15926	Idh1	isocitrate dehydrogenase 1 (NADP+), soluble
5 NM_011825	23893	Prdc	protein related to DAN and cerberus
5 BC002235	217449		CGI-87 protein (94% human)
5 AK015391	73332		RIKEN cDNA 1700041C02 gene
5 AK020041	77067		ref:NP_060056.1 - chromosome 9 open reading frame 7 [Homo sapiens] 92.94 %
5 NM_008351	16159	Il12b	interleukin 12 p35 subunit
5 NM_010443	15369	Hmx2	homeobox gene
5 NM_025504	66349		RIKEN cDNA 2310004L02 gene
5 AK019581	78125		RIKEN cDNA 4930423F13 gene
5 AK011831	70433		RIKEN cDNA 2810109H07 gene
5 NM_018808	81489	Dnaip1	DnaJ (Hsp40) homolog, subfamily B, member 1

FIGURE 16-4

cluster analysis I
lung cancer
striatum

Clust Accnt	Locus	Gene	Description
6 AK018169	14780	Gox5	glutathione peroxidase 5
6 NM_010343	87107	RIKEN cDNA 2800001A12	zona pelfucida glycoprotein 3
6 NM_025971	22788	Zp3	RIKEN cDNA 1700019N19 (100% Mus musculus)
6 NM_011776	67507		T30249 cell proliferation antigen K1-67 - mouse 100 %
6 NM_026208	17345	Mk-67	phosphogluconate dehydrogenase
6 X82785	110208	Pdg	lecopherol (alpha) transfer protein
6 AK002894	50500	Tba	integrin alpha 7
6 AK004882	16404	Itp37	putative neuronal cell adhesion molecule punc
6 NM_008988	19289	Punc	amiloride binding protein 1 (amine oxidase, copper-containing)
6 NM_008988	19289	Punc	
6 AK005423	76507	Alp1	cytochrome c oxidase subunit VIIb2 (59% human)
6 AK019565	78174		
6 S45012			
6 AK013903			
6 S63758	17749	Mit1a	metallothionein-1 activator
6 NM_007528	12029	Bazf	bcl5-associated zinc finger protein bazf
6 AK017470	71449		RIKEN cDNA 5630401D24 gene
6 AK016633	71060		Similar to fucose hormone sensitive [65% Rattus norvegicus]
6 NM_008361	19212	Pter	phosphatidylesterase related
6 US5650	18232	Nrph2	neuritephilin 2
6 NM_009133			
6 AK008083	72041		RIKEN cDNA 2010004B12 gene
6 AK004676	67459		Similar to nuclear VCP-like; Nuclear velosin-containing protein-like [Homo sapiens] 87 %
6 NM_007528	20284	Scrg1	scrapie responsive gene 1
6 NM_009138	27416	Abcc5	ATP-binding cassette, sub-family C (CFTR/MRP), member 5
6 NM_013790	54582	Lrrc6	leucine-rich repeat-containing 6 (testis)
6 NM_019457	54582	Gahbp1	GPI-anchored HDL-binding protein 1
6 AK003305	68453		putative NE-DNA-methyltransferase
6 AK012019	67768	N6am1	arginase type II
6 NM_009705	11847	Arg2	
6 NM_025333			
6 D53902	22660	Trim25	estrogen-responsive finger protein; clone mgc-8886
6 AF302138		Ndph	Norrie disease homolog
6 NM_010883	17986		
6 NM_023371			
6 BC005711			
6 NM_026160	87443	Map1lc3	microtubule-associated protein 1 light chain 3
6 NM_008622	17527	Mpv17	mpv17
6 AK014242			
6 NM_013867	15201	Helis	helicase lymphoid specific, helis
6 NM_008234	71240	Osbp7	oxysterol binding protein-like 7
6 AK017095	16447	Inv	invariant
6 NM_008412	15413	Hox5	homeobox hox2.1 protein conserved peptide is located at positions 628-645; 10 days embryo riken cdna clone:2810524h04
6 NM_008268	77891		RIKEN cDNA 6720463F12 gene
6 BC012255	56538	Prs320	hippocastin prostate type
6 NM_019974			
6 BC004768	11932	Alp1b2	altpase na+/k+ transporting beta 2 polypeptide
6 NM_013415	107869	Cln	cystathionase (cystathionine gamma-lyase)
6 AK002480	68628		1110017H11Rik RIKEN cDNA
6 AK003747	15218	Foxn1	forkhead box n1
6 NM_008238	26565	Plazg10	phospholipase A2, group X
6 AF210429			
6 AK003890			
6 NM_010731	16969	Lrf	leukemia/lymphoma related factor b1 transcriptional repressor plzf
6 BC004752	58452	Orc6	origin recognition complex subunit orc6
6 NM_019716			
6 AK016647			
6 NM_009367			
6 NM_007874	13476	Dp1	10 11 days embryo riken cdna clone:2810423g21; deleted in polyposis dp1
6 AJ006215	12764	Cnras	cyclidine monophospho-N-acetylneuraminic acid synthetase
6 NM_011748	22652	Mkn3	makorin, ring finger protein, 3
6 AK006923	73476		RIKEN cDNA 1700069L16 gene
6 NM_013744	27274	Zfp354b	zinc finger protein 354B

FIGURE 16-5

cluster analysis of
lung cancer
striatum

Clust Access	Locus	Gene	Description
7 AK014435			
7 NM_009537	17117	Ambr	alpha-methylacyl-CoA racemase
7 AK015348	66799		Similar to Ubiquitin-conjugating enzyme E2-23 kDa (Ubiquitin-protein ligase) [42% mouse]
7 NM_025963	67097		2113200G ribosomal protein S10 (88% human)
7 NM_019538	56096	Plac1	placental specific protein 1; ectoplacental cone, invasive trophoblast giant cells, extraembryonic Mus Musculus 100 %
7 U48737	19134	Tipk	serine/threonine-protein kinase prp4m s. pombe prp4; swissprot accession number Q07538; trap line cl 143 prp4 protein homolog cbp143 chromosomal
7 AF176530	50764	Fbox15	F-box only protein 15
7 AK014820	74351		DD17_HUMAN Probable RNA-dependent helicase p72 (DEAD-box protein p72) (DEAD-box protein 17) 49 % /
7 NM_021316	57754	Bn88	BM88 antigen, Mus musculus 100 %
7 NM_013612	18173	Sic11a1	soluble carrier family 11 protein-coupled divalent metal ion transporters member sic11a1; natural resistance associated macrophage protein
7 AK013804	70839	P2y12	purinergic receptor P2Y1, G-protein coupled 12
7 AK012767	109065		RIKEN cDNA 1110034A24 gene
7 AK006613	76758		gasdermin [Mus musculus] 81 %
7 NM_007737	12832	Col5a2	collagen type V alpha 2(CV)-2
7 NM_009254	20719	Serpinc6	serpin (or cysteine) proteinase inhibitor, clade B, member 6
7 BC017533			
7 X98848	18639	Pfkfb1	6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 1
7 AK014376	71822		Similar to ANK1_MOUSE Ankyrin 1 (Erythrocyte ankyrin) 34%
7 NM_010181	14119	Fbn2	fibrillin 2
7 AK015945			
7 NM_016596	14733	Gpc1	glypican 1
7 AK014905	70892		T12515 hypothetical protein DKFZp434B103.1 - (28% human)
7 NM_009237	20875	Sox3	SRV-box containing gene 3
7 NM_008172	14814	Gln2d	glutamate receptor channel subunit epsilon 4
7 NM_008642	17777	Mitp	microsomal triglyceride transfer protein
7 AK009710	69639		RIKEN cDNA 2310040A07 gene
7 NM_018781	54366	Calnail1	calenin alpha-like 1
7 NM_015785	53604	Zbp	zona pellucida binding protein
7 AK020704	77574		RIKEN cDNA A230020K05 gene
7 AK017056	71233		adult male testis riken cDNA clone:4933434d06
7 NM_053272	74754	Dhcr24	24-dehydrocholesterol reductase
7 NM_011022	18643	Pin1	pinin 1
7 NM_016863	14226	Fkbp1b	fk506-binding protein 12.6 fbp-12.6
7 AK014485			
7 AK018146	17344	Miz1	Miz-interacting-zinc finger
7 NM_019402			
7 AK016424	70983		RIKEN cDNA 4931402H11 gene
7 NM_023143	50909	Ctr	complement component 1, r subcomponent
7 NM_008716	18131	Notch3	Notch gene homolog 3 (Drosophila)
7 NM_008662	17920	Myo6	myosin vi myo6
7 AK020007	78066		ref:NP_055672.1 - KIAA0471 gene product [Homo sapiens] 83.55 %
7 NM_020594	57432	Filz1	fetal liver zinc finger 1
7 BC004690			
7 NM_011067	18628	Per3	period homolog 3 (Drosophila)
7 NM_021331	14378	G6pc-1s	glucose-6-phosphatase, catalytic, related; islet specific glucose-6-phosphatase [Mus musculus] 100 %
7 AK009532			
7 AK003055	52592		DNA segment, Chr 12, ERATO D01 407, expressed
7 AK005073	18012	Neurod1	adult male cerebellum riken cDNA clone:1500032a24
7 AK011781	72482		Similar to hypothetical protein MGC2404 [85% Homo sapiens]
7 NM_021407	58218	Trem3	triggering receptor expressed on myeloid cells 3
7 AK019166	78779		sp:O9JIM82 - SAT2_HUMAN Spermatogenesis associated protein 2 (Spermatogenesis associated protein PD1) 29 %
8 NM_010736	17000	Lbr	lymphotxin b receptor
8 BC002230			similar to hypothetical protein FLJ10008 [Homo sapiens]
8 AK014919	66336		Similar to CAMP [71% Mus musculus]
8 NM_022014			
8 AK010654	72425		
8 BC006051	20787	Srebf1	sterol regulatory element binding protein srebp1; clone image:3580844
8 NM_026306	67674		- RIKEN cDNA 0610038D11 [Mus musculus]
8 NM_019514			
8 AK007368			
8 AK004989	68112	Sial8a	adult male liver riken cDNA clone:1300013315
8 NM_011374	20449		alpha 2B-sialyltransferase gds synthase putative

FIGURE 16-6

cluster analysis I
lung cancer
stroma

Chart Access	Locus	Gene	Description
8 NM_028889	93363		RIKEN cDNA 483143001 [Mus musculus]
8 NM_029588	76383		H2AM_HUMAN Histone H2A.m (H2A/m) 39 %
8 NM_011778			
8 NM_030696			
8 AK012851			
8 NM_019794			
8 AK005581			
8 NM_007637	20451	Stat8c	sialyltransferase alpha-2,8-sialyltransferase c stat8c
8 NM_009182	60911	Acot3	pristanoyl-coa oxidase acot3
8 NM_030721	74146		RIKEN cDNA 1200017A24 gene
8 NM_028785	74146	Olor	otioraplin [Mus musculus] 100 %
8 NM_020595	57329	En2	engrailed 2
9 NM_010134	13799	Cyp17a1	cytochrome P450, family 17, subfamily a, polypeptide 1
9 NM_007809	13074		Mus musculus mRNA for hypothetical protein (ORF 1) clone
9 AJ277212			beaded filament structural protein in lens-CP94
9 NM_009751	12057	Blsp1	PEBP_MOUSE Phosphatidylethanolamine-binding protein (PEBP) 40 %
9 AK006964	73523		mesenchymal stem cell protein DSC54 [92.03% Homo sapiens]
9 AK017282	71373	Eno3	muscle-specific enolase beta 3 end subunit ec 4.2.1.1; muscle eno3
9 NM_007933	13808	Eno3	muscle-specific enolase beta 3 end subunit ec 4.2.1.1; muscle eno3
9 NM_010832	17892	Msi31	male-specific lethal-3 homolog 1 (Drosophila)
9 AK018156	70725		Mus musculus adult male medulla oblongata cDNA, RIKEN full-length enriched library, clone 6330411D24 product: hypothetical protein
9 NM_010031	16582	Kifc3	kinasin family member c3 clone image:3590983; kifc3
9 NM_026312			
9 MG4429	109880	Braf	Braf transforming gene
9 NM_009242	20692	Sparc	17 days embryo head riken cDNA clone:3200001111; cysteine-rich glycoprotein sparc aa 1-302
9 AK020831	77794		T0260 hypothetical protein KIAA0605 - human 97 %
9 NM_010745	17084	Ly86	lymphocyte antigen 86
9 AK016972	71198		RIKEN cDNA 4933426L19 gene
9 NM_009122	20230	Salb1	special AT-rich sequence binding protein 1
9 NM_008450	18593	Kns2	kinasin 2
9 BC003243	226442		hypothetical protein LOC226442
9 NM_010770	17182	Moin3	melittin 3
9 NM_026063	67267		RIKEN cDNA 2900010M23 [Mus musculus] 100 %
9 BC018387	67200		hypothetical protein MGC13183 [Homo sapiens] 81 %
9 AK020727			
9 NM_008075	14408	Gabr1	gamma-aminobutyric acid receptor rho1 subunit ionotropic gaba
9 NM_023850			
9 NM_008707	18107	Nmi1	N-myristoyltransferase 1
9 AK009578	71912		
9 NM_007932	13805	Eng	edg endoglin lgr-beta receptor iii homologi: eng
9 NM_030718			
9 AK010350			
9 NM_027671			
9 NM_028908	69008		MOZL_HUMAN MOZ5-like protein 98 %
9 NM_019518			
9 NM_019639	22190	Ubc	ubiquitin C
9 NM_021879			
9 AK017036	66786		
9 AK020699			
9 NM_016668	12116	Bhmt	betaine-homocysteine methyltransferase
9 NM_011228	19337	Rab33a	rab33a member of ras oncogene family
9 AK017641			
9 NM_024255	72479		RIKEN cDNA 2610207116 gene
9 AK020444	77254		RIKEN cDNA 9430029K10 gene
9 AF133300	289102	mor17-1	orulatory receptor mor17-1
9 AK006180	75509		RIKEN cDNA 1700020N15 gene
9 NM_026317	67690		adult male testis riken cDNA clone:1700016g05
9 NM_009171			
9 NM_020273	56809	Gnab1	glucocorticoid modulatory element binding protein 1 [Mus musculus] 100 %
9 NM_010833	17698	Mfn	moesin
9 AK010784	67383		RIKEN cDNA 2410127L17 gene
9 NM_009281	20841		zinc finger protein 143

FIGURE 16.7

cluster analysis I
lung cancer
striatum

Clust Access	Locus	Gene	Description	
9 NM_028564	73534		Sou1 male les1s riken cDNA clone:170082m22	
9 AF188290	26903	Dysl1	Dysferlin	
9 NM_024250	72057		PHD zinc finger protein XAP135, isoform a [Homo sapiens] 96 %	
10 AK004375				
10 NM_023197	71421		6 days neonate head riken cDNA clone:3430427o21	
10 AK017352	70873		RIKEN cDNA 4921517L17 gene	
10 AK014912			RIKEN cDNA 4930544L04 gene	
10 NM_030554			sepin 7	
10 AK019737	78807	Sep-07	CFP1_HUMAN Pre-mRNA cleavage complex II protein C1p1 (98% human)	
10 AJ273782	235072		RIKEN cDNA 4632428M11 gene	
10 AK014439	98985		Cbp/p300-interacting transactivator, with Glu/Asp-rich carboxy-terminal domain, 4	
10 BC003237	74043	Cited4	Friend virus susceptibility 4	
10 AK014598	56222		rho gdp dissociation inhibitor gdl gamma arhgdg	
10 NM_019563	14352			
10 NM_010245	14352			
10 NM_008113	14570	Arhgdg		
10 BC005653				
10 AK017525				
10 BC017627				
10 NM_016884	15381	Hnmpc	heterogeneous nuclear ribonucleoprotein c hnmpc	
10 AK005193	68972	Hsd17b11	product/hypothetical metallo-dependent hydrolases structure containing protein	
10 NM_053262	114664		putative Rab5-interacting protein [Homo sapiens] 98 %	
10 NM_026124	67388		expressed sequence AU019489	
10 AK018545	104943	Sncg	synuclein gamma sncg	
10 NM_011430	20618		solute carrier family 21 (organic anion transporter), member 13	
10 NM_023718	28254	Ctadh	consackiavirus and adenovirus receptor	
10 NM_009988	13052	Taf6	TAF8 RNA polymerase II, TATA box binding protein (TBP)-associated factor	
10 NM_009315	21343	Sval2	seminal vesicle antigen-like 2; SLP in the mammary gland; SVA-like protein in the mammary gland [Mus musculus] 100 %	
10 NM_032542	84543	Msk4	Msk3 and SOK1-related kinase	
11 BC005708	70415	Condop1	Cyclin D-type binding-protein 1	
11 NM_010761	17151		L1 cell adhesion molecule	
11 AF133093	1216d		FRH_MOUSE Feritin heavy chain (Feritin H subunit) 41 %	
11 AK008151	70114		Similar to putative metalloproteinase (family M19) [Homo sapiens] 71 %	
11 AK005095	71854		hypothetical protein FLJ14117 [Homo sapiens] 90 %	
11 AK005820	67286	Mel	cell line NK14 derived transforming oncogene	
11 NM_023126	17274	Hcngp	11 days embryo riken cDNA clone:2700016d05 full insert sequence; hcngp	
11 NM_020483	57230	Fxyd4	FXYD domain-containing ion transport regulator 4	
11 NM_033648	108017	Chmi1	creatine kinase, mitochondrial 1, ubiquitous	
11 NM_009887	12716	Fkbp8	FK506 binding protein 8	
11 NM_010223	14232		RIKEN cDNA 170003SD13 gene	
11 AK006539	73293		KLK9_HUMAN Kallikrein 9 precursor (Kallikrein-like protein 3) (KLK-L3) 78 %	
11 AK004807	73832	Cyp2d22	Cytochrome p450 cyp2d22	
11 NM_019823	56448			
11 AK005582				
11 AK019529	78283		retNP_116187.1 - hypothetical protein FLJ14503 [Homo sapiens] 71.76 %	
11 NM_008174	14823	Gpr17h	g protein coupled receptor family c group member h gpr17h	
11 NM_009461	22222	Ubr1	ubiquitin protein ligase E3 component n-recognition 1	
11 NM_010896	18014	Neurod3	neurogenic differentiation 3 neurod3	
11 NM_013718			complement component 4 binding protein	
11 NM_007576	12269	Cd4p	undifferentiated embryonic cell transcription factor ufr1	
11 NM_009482	22286	Ufr1	plenn B2	
11 BC007481	140570	Phnb2	homocysteine-inducible endoplasmic reticulum stress-inducible ubiquitin-like domain member herpud1	
11 NM_022331	64209	Herpud1	immediate early response 5	
11 NM_010500	15939	Ier5	expressed sequence AW123240	
11 BC004678	101333	Sd14	stromal cell derived factor 4	
11 NM_011341	20318	Rag2	recombination activating gene 2	
11 NM_009020	19374		leucine-rich and death domain containing; p53 protein induced, with death domain [Mus musculus] 40.00 %	
12 AK008713	70388	Map3k6	mitogen-activated protein kinase kinase kinase 6	
12 NM_016693	53608	Lama2	laminin-2 alpha2 chain m-chain merosin chain m-chain	
12 U12147	16773		rho polymerase ii 4 14 kda subunit rp02-4	
12 NM_011293	20022	Rpo2-4		
12 NM_007951				

FIGURE 16-8

cluster analysis I
lung cancer
striatum

Contig Access	Locus	Gene	Description
12 AK019409	103425		RIKEN cDNA 3100002P13 gene
12 AF435852			
12 BC017648	72169	Trim29	10 11 days embryo riken cDNA clone:2810431n19; clone image:3498575
12 BC006699	22758	Zip96	zinc finger protein 96 zip96
12 U62908	69746		RIKEN cDNA 2410019A14 gene
12 AK010555	19035	Ppb	adult male kidney riken cDNA clone:0810008p05
12 NM_011149	17293	Mesp2	mesoderm posterior 2 mesp2
12 NM_008589			
12 NM_020514	22238	Ugt2b5	udp-glucuronosyltransferase ec 2.4.1.17 precursor 530 aa; adult male kidney riken cDNA clone:0610033e06
12 NM_009467			
12 AK019402			
12 NM_020025	26878	B3gal2	udp-gal:betaglc beta 13-galactosyltransferase polypeptide b3gal2
12 BC003625			
12 NM_031379			
12 AK003742			
12 NM_019542	56174	Nagk	N-acetylglucosamine kinase
12 NM_020046			
12 NM_011364	20400	Sh2d1a	SH2 domain protein 1A
12 NM_011408			
12 AK006335	60416		RIKEN cDNA 1700025F22 gene
12 NM_009433			
12 AK017439			
12 NM_018779			
12 NM_030705	80889	Mesdc1	mesoderm development candidate 1
12 NM_019916	27140	Tlx3	T-cell leukemia, homeobox 3
12 NM_013505	13506	Dsc2	desmocollin type 2 dsc2 alternatively spliced form dsc2b; dsc2a
12 U62907	22757	Zip95	zinc finger protein 95 zip95
12 NM_011336	20301	Soy27	adult female placenta riken cDNA clone:1600023b02; small inducible cytokine a27 soy27
12 NM_026021			
12 AK014627	74576		RIKEN cDNA 4731417B20 gene
12 NM_007609	12363	Casp11	caspase 11 casp11; caspase-11
12 NM_011863			
12 NM_025419			
12 NM_025661	66612	Omdl3	ORM1-like 3 (S. cerevisiae)
12 NM_031182	17428	Mnl	iox protein proline rich basic helix-loop-helix leucine zipper protein; myc antagonist mml max-network bhhzfp
12 NM_010913	21940	Trifsf7	tumor necrosis factor receptor superfamily, member 7
12 L24495			
12 AK018320			
12 NM_020024	24075	Taf10	TAF10 RNA polymerase II, TATA box binding protein (TBP)-associated factor
12 AK003651	14000	Elohl2	ethanol induced 2 [putative ribonuclease III; putative protein p241 which interacts with Sp1 (Hom 99 %]
12 NM_009046	19698	Relb	transcription factor relb
12 AK008928			
12 NM_026181			
12 NM_016561	269378	Abyc	S-adenosylhomocysteine hydrolase
12 NM_028753	74097	Rpp20	Pap7 homolog
12 AK005456	75596	Pripn	prolactin-like protein N
12 NM_010795	17309	Mgat3	n-acetylglucosaminyltransferase II mgat3 glycosyltransferase coding region; mannosidase acetyl glucosaminyltransferase 3
12 AK003899			
12 AK018263	73316	Calr3	calreticulin 3

Figure 16-9

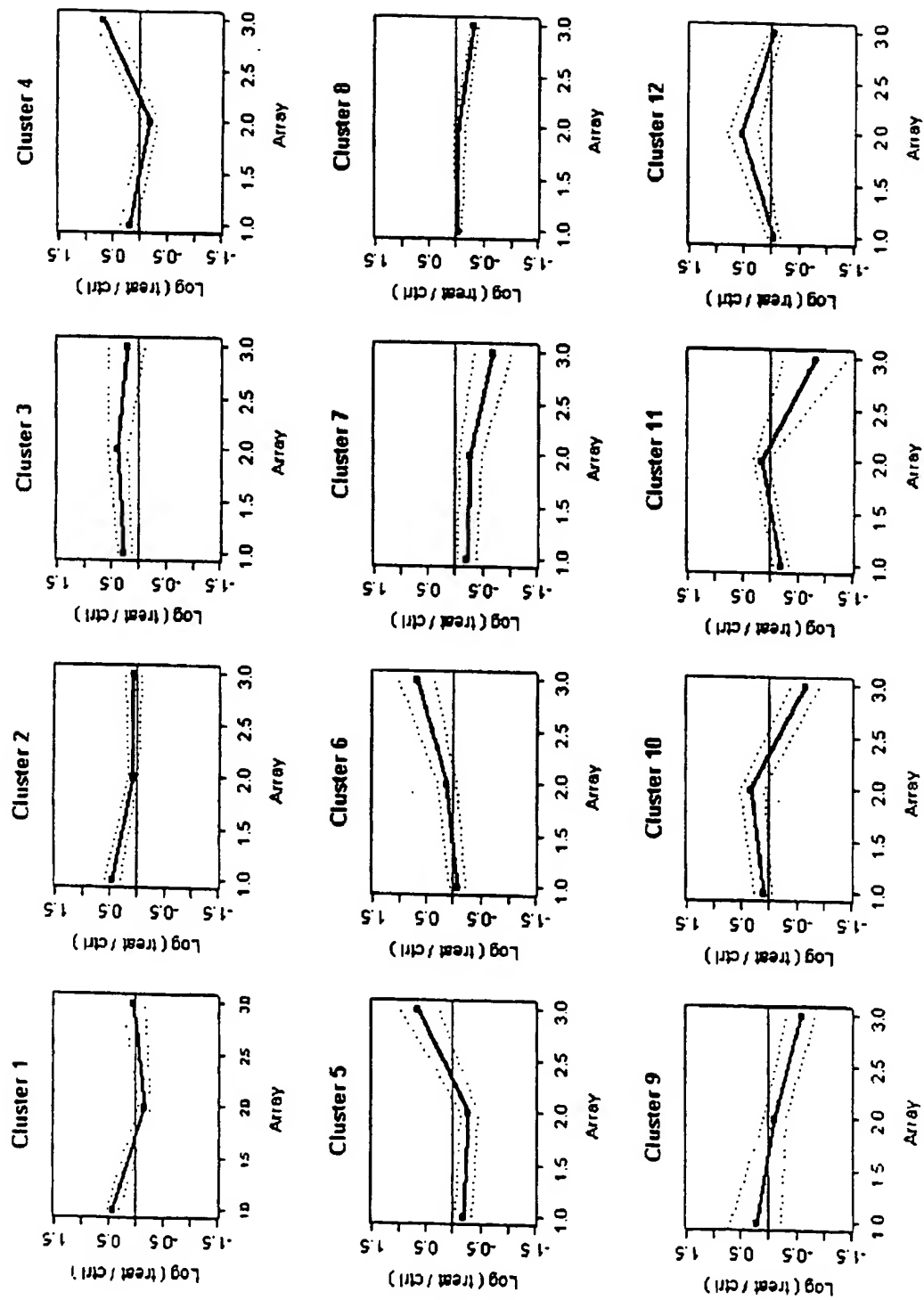


FIGURE 17-1

Cluster	Access	Locus	Gene	Description
1	NM_010671	16599	Krtap13	keratin associated protein 13
1	NM_023831	75568		RIKEN cDNA 1500035H01 gene
1	NM_018435	104130	Np15	Nuclear neuronal protein 15.8
1	AK004164	68777		hypothetical protein FLJ22353 (Homo sapiens) 85 %
1	AK017052	71210	Trim11	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933404C23 product:unclassifiable
1	NM_053168	94091	Ccd4	Inparite motif protein trim11
1	NM_013652	20303		chemokine (C-C motif) ligand 4
1	AK015192	73946		interleukin 6 receptor, alpha; IL-6 receptor alpha chain (82% Mus musculus)
1	NM_023266	104348	Zfp120	zinc finger protein 120
1	NM_010351	14836	Gsc	goosecoid csc
1	NM_011054	18575	Pde1c	phosphodiesterase 1C
1	AK016847	73845		AS5575 enhym 3, long splice form - (28.81% human)
1	NM_021339	57810	Cdon	oncogene-regulated cell adhesion molecule orcam
1	NM_010839	17783	Micp1	mature T-cell proliferation 1
1	AK017105	71243		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933438A12 product:unclassifiable
1	AK021182	77816		beta-amyloid binding protein bbp integral membrane glycoprotein
1	AF353993	94043	Bbp	Wnt inhibitory factor 1
1	NM_011915	24117	Wif1	Teirspan NET-6 (95% human)
1	AK012571	68109		RIKEN cDNA 1110068E08 gene
1	AK010471	68876		RIKEN cDNA 2010001E11 gene
1	AK008003	72045		Similar to APXL_HUMAN Adcal-like protein (APXL protein) huma 28 %
1	AK004934	71774	Oat2	odd Ozfem homolog 2 (Drosophila)
1	NM_011858	23864	Calc1	calcium/calmodulin-dependent serine protein kinase
2	NM_009808	12361		RIKEN full-length enriched library, clone:5430403H02
2	AK017271	52447		DNA segment, Chr 8, ERATO Dd 633, expressed
2	AK017529	52504		expressed sequence AH48222
2	AK018444	23785	Agtr2	anterior gradient 2 (Xenopus laevis)
2	NM_011783	23785	Sk7a10	solute carrier family 7 (calcionic amino acid transporter, y+ system), member 10
2	NM_017394	53896	Map2k6	mitogen activated protein kinase kinase 6
2	X97052	26399		RIKEN cDNA 4933406P04 gene
2	AK016707	74420		CA00_HUMAN Protein CGL-100 precursor (89% human)
2	AK014490	73130		kallinin p60 subunit A 1 (57% human)
2	AK017114	71206	Csk1e	casein kinase 1, epsilon
2	NM_013767	21373	Pripm	profilin-like protein M
2	NM_019991	56635	Man2b2	mannosidase 2, alpha B2
2	NM_008550	17160	Cg194	CGI-94 protein
2	NM_026031	87205	Bmp15	growth differentiation factor-9b; bone morphogenetic protein 15 bmp15
2	NM_009757	12155	Puma-g	putative seven transmembrane spanning receptor puma-g
3	NM_030701	80885		similar to pr:700322 - T00322 hypothetical protein KIAA0542 - human 62 %
3	AK019095	78887	Krl1-2	keratin complex 1, acidic, gene 2
3	NM_010685	16670		fibroblast activation protein
3	NM_007988	14089	Fap	peliovirus receptor-related 3
3	NM_021496	58998	Pvrl3	Mus musculus 6 days neonate head cDNA, RIKEN full-length enriched library, clone:5430417C01 product:hypothetical protein
3	AK019846	78548		RIKEN cDNA 5730513H21 gene
3	AK017769	70614	Asd2	achaeic-scute complex homolog-like 2 (Drosophila)
3	NM_008554	17173		mucin 10, submandibular gland salivary mucin [Mus musculus] 30 %
3	AK007869	72056		PGPI_HUMAN Probable pyroldone-carboxylate peptidase (5-oxopropyl-peptidase)
3	NM_023217	66522		NGF-A binding protein 1
3	AK007013	74282	Nab1	caspace 9
3	NM_008867	17936	Casp9	hepatocyte growth factor
3	NM_015733	12371	Hgf	Nii protein 2 [89% Homo sapiens]
3	X72307	15234		unc-84 homolog A (C. elegans)
3	NM_023175	52633	Unc84a	perinatal skeletal myosin heavy chain 3 end
3	AF343752	77053	Myh8	cytoolic 1-lymphocyte-associated protein 4
3	M12289	17885	Ctla4	C-terminal PDZ domain ligand of neuronal nitric oxide synthase
3	NM_005843	70729	Capon	HSPC038 protein [Homo sapiens] 100 %
3	AK018149	68036		Similar to hypothetical protein FLJ11259 [Homo sapiens] 93 %
3	AK004552	71712		calmodulin and integrin binding 1 (calmyrin)
4	NM_011870	23991	Cbl1	JC8547 high sulfur protein B2E - rat 37 %
4	NM_027170	69696		alp synthase h+ transporting mitochondrial 1110 complex subunit e alp5k; hrm-1 1110-alpase
4	NM_007507	11958	Alp5k	

FIGURE 17-2

Cluster	Access	Locus	Gene	Description
4	AF056187	16001	Igf1r	insulin-like growth factor I receptor Igf-I
4	NM_023167	69163	Mp14	mitochondrial ribosomal protein L4
4	AK007667	69171		
4	NM_026318	67693		Huntingtin interacting protein K; hypothetical protein [Homo sapiens] 99
4	NM_023786	75625		RIKEN cDNA 2010107K23 gene
4	AK005678	321010		hypothetical protein MGC2656 [56% Homo sapiens]
4	NM_030562	80746		gap junction membrane channel protein epsilon 1
5	NM_080450	118446	Gje1	RIKEN cDNA 49334031H05 gene
5	AK015333	74435		adenosine deaminase, tRNA-specific 1 [Mus musculus] 100 % /
5	NM_013925	30947	Adal1	neuronalized homolog drosophila neur1
5	NM_021360	18011	Neur1	SMC2 structural maintenance of chromosomes 2-like 1 (yeast)
5	NM_008017	14211	Smc211	solute carrier family 35 member Slc35a2 uop galactose translocator, mugl1 uop-galactose transporter
5	NM_078484	22232	Slc35a2	serine domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 68
5	NM_013662	20359	Sema6b	T46611 CL28B protein - rat (31 % R.norvegicus)
5	AF356237	70967		hypertile motif protein 11 [Mus musculus] 33.50 %
5	AK030190	106660		potassium voltage-gated channel, shaker-related subfamily, beta member 3
5	NM_010599	16459	Kcnab3	spermine synthase
5	NM_009214	20603	Sms	ectoplacental cone, invasive trophoblast giant cells, extraembryonic ectoderm and chorion sequence 3
5	NM_025310	56095	Epc3	RIKEN cDNA 2610507L03 [Mus musculus] 100 %
5	NM_028120	72140		2-cell-stage, variable group, member 1; variable group of 2-cell-stage gene family
5	AF067063	73503		chromosome 20 open reading frame 10 (55% human)
5	AK007294	19167	Pyno3	proteasome (prosome, macropain) subunit, alpha type 3
5	NM_011184	16770	Lalbs	alpha-lactalbumin
5	NM_010879	78834		10 days embryo riken cDNA clone:2610029C06
5	AK019163	71098		Serine/threonine kinase FKSG81 [Homo sapiens] 44 %
5	AK016690	30839	Fbxw5	F-box and WD-40 domain protein 5
5	NM_013908	30839		transcription repressor Cri-1 developmentally regulated related to the cp2 family of factors
5	NM_023755	81879	Crt1	ubiquitin specific protease 5 (isopeptidase T)
5	NM_013700	22225	Ubp5	bone marrow stromal cell antigen 1
5	NM_009763	12182	Bs11	RIKEN cDNA 261026C17 gene
5	AK011897	72495		Rap8-interacting protein 2 [Mus musculus] 23.38 %
6	AK006472	74239	Tyk1	thymidylate kinase family LPS-inducible member
6	L32973	22169	Nrb1	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
6	NM_010909	18038	Nrb1	androgen recept
6	NM_013476	11835	Ar	cholecystokinin A receptor
6	NM_009827	12425	Cckar	BC12-like 12 (proline rich); Bo-2 like proline-rich protein 12 [Homo sapiens] 81 %
6	AK017362	75736	Fut4	lucosyltransferase 4
6	NM_010242	14345		Similar to hypothetical protein FLJ20546 (82% Homo sapiens)
6	AK010876	66628	Tnfrsf3	tumor necrosis factor (ligand) superfamily, member 13
6	NM_023517	69583	Gor10b	G protein-coupled receptor 108
6	BC016104	78308		Mus Musculus type D-like endogenous retrovirus MusD2, complete sequence
7	AF246633			Mus Musculus type D-like endogenous retrovirus MusD2, complete sequence
7	NM_026309	67678		LSM3, HUMAN U6 snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
7	NM_009838	12466	Ccfa	chaperonin subunit 6a (zeta)
7	X58472	16586	Kin	antigenic determinant of rec-A protein
7	NM_007657	12527	Cd9	CD9 antigen
7	NM_009255	20720	Serpine2	serine (or cysteine) proteinase inhibitor, clade E, member 2
7	AK017931	74753		collator required for Sp1 transcriptional activation subunit 2 (150 kDa) [69.57% Mus musculus]
7	NM_021332	14652	Gip1r	glucagon-like peptide 1 receptor
7	AK016763	71085		RIKEN cDNA 4933411B03 gene
7	AK021160	77478		Mus musculus adult male corpus striatum cDNA, RIKEN full-length enriched library, clone:C030046J01 product: hypothetical protein
7	NM_024465	76192		RIKEN cDNA 6330583M11 gene
7	NM_008348	16154	Il10ra	interleukin-10 receptor alpha
7	AK013432	67608		Similar to nuclear retalinin A recognition factor, isoform a [84% Homo sapiens]
7	AF060246	22647	Zfp106	zinc finger protein 106
7	NM_009744	12053	Bcl6	B-cell leukemia/lymphoma 6
7	M20985	224756	H2-M1	histocompatibility 2, M region locus 1
7	NM_019745	56426	Pdcd10	programmed cell death 10
7	NM_030749	81500	Sat1	Sat1
7	NM_013483	12231	Bin1a1	bulkyophillin, subfamily 1, member A1
7	NM_030553	80706	Ofr160	Ofr160
7	AK003011	17714	Gpel2	Gpel2-like 2, mitochondrial

FIGURE 17-3

cluster analysis II
lung cancer
striatum

Cluster Access	Locus	Gene	Description
7 AK015430	74655	RIKEN cDNA 4930449E07 gene	
7 NM_009732	11998	Arginine vasopressin	
7 NM_011658	22160	Twist1	twist1 gene homolog 1 (Drosophila)
7 AK004654	71709		similar to A49307.98K GTPase-activating protein ABR, brain - human 29 %
7 X59150	21594	Terb1-V20	T-cell receptor beta, variable V20
7 NM_018888	56048	Bf2b	basic FGF repressed, Zic binding protein
8 AK009086	69533		similar to keratin associated protein 4.7 [31% Homo sapiens]
8 NM_011798	23832	Xor1	chemokine (C motif) receptor 1
8 AK018541	71564		9030607L17Rik RIKEN cDNA 9030607L17 gene
8 AK007540	69769	Tor1b	hypothetical protein FLJ23467 [Homo sapiens] 93 %
8 AJ287743	30934	Celsr1	torin family 1, member B
8 NM_009886	12614		codherin epl tag seven-pass g-type receptor celsr1
8 AK017569	74737		RIKEN cDNA 5730417B17 gene
8 NM_007442	11695	Ahx4	aristalless 4
8 NM_010473	15464	Hic	histidine rich calcium binding protein
8 NM_020606	57342	Ppva8	parvin, alpha
8 NM_007549	12143	Blk	B lymphoid kinase
8 NM_007374	12262	C10g	complement component 1, q subcomponent, gamma polypeptide
8 NM_016050	54123	Irf7	interferon regulatory factor mif7 transcription
8 NM_011919	26356	Ing1	inhibitor of growth family, member 1
8 NM_014599	77042		Similar to sperm adhesion molecule 1 (PH-20 hyaluronidase, zona pellucida binding) [45% Homo sapiens]
8 AK014599	72297	B3gnl3	UDP-GlcNAc 6-epimerase 3
8 NM_028189	72309		UDP-GlcNAc 6-epimerase 3
8 AK009669	72309		UDP-GlcNAc 6-epimerase 3
8 US2885	13638	Elna3	epherin A3
8 AK013202	20467	Sin3b	transcriptional regulator, SIN3B (yeast)
8 AK016187	75303		RIKEN cDNA 4330562A09 gene
8 NM_009537	22632	Yy1	YY1 transcription factor
8 AK009344	76948		Similar to WD domain, G-beta repeat-containing protein [Homo sapiens] 83 %
8 AK005105	68980		RIKEN cDNA 2310014L17 gene
8 AK015924	75178		Similar to WD domain, G-beta repeat-containing protein [Homo sapiens] 83 %
8 NM_023047	65254	Dysl5	RIKEN cDNA 4330528F23 gene
8 BC002163	170658	Ndufa5	dihydropyrimidinase-like 5
8 NM_009115	20203	S100b	NAADH dehydrogenase (ubiquinone) Fe-S protein 5
8 AK006201	57755	DnaJ1	S100 protein, beta polypeptide, neural
8 NM_007565	12193	Zfp382	DnaJ (Hsp40) homolog, subfamily B, member 7
8 NM_009060	19733	Rgn	zinc finger protein 38, C3H type-like 2
8 AK013166	67607		regucalcin
8 NM_020505	57257	Vav3	Similar to 148568 zinc finger protein 51 - mouse 43%
8 NM_016737	20887	Slp1	vav 3 oncogene
8 NM_013516	14126	Ms4a1	stress-induced phosphoprotein 1
8 AK012535	101513		mast-cell high affinity type receptor fc-epsilon-1 beta subunit
8 NM_011480	20853	Slau1	expressed sequence A1256456
8 NM_011505	20813	Slkbp4	slau1 rna-binding protein homolog drosophila slau1; adult male liver riken cDNA clone:1300014g04
8 NM_013784	27392	Pign	synlaxin binding protein 4
8 NM_019468	14380	G6pd2	phosphatidylinositol glycan, class N
8 NM_009466	22235	Ugph	glucose-6-phosphate dehydrogenase
8 NM_021540	59044	Rnf130	UDP-glucose dehydrogenase
8 AK007164	76627		ring finger protein 130
8 AK007637	69151		
8 NM_015924	56613	Rps8ka4	ribosomal protein S6 kinase
8 AK018435	71463	Fyp	18 days embryo lung riken cDNA clone:8430422m09
8 AF061744	23680	Ncoa6	lyn binding protein lya-130
8 NM_015925	56406		nuclear receptor coactivator 6
8 AK010559	69743		Similar to hypothetical protein FLJ20321 [87% Homo sapiens]
8 AK017530	70502	Tpr1	RIKEN cDNA 5730409E15 gene
8 NM_009420	22024		testis specific gene 1
8 AK020272	77675	Olf67	RIKEN cDNA 9130204G15 gene
8 NM_013519	18368		olfactory receptor 67
8 AK002774	72114	Dullard	hypothetical protein MGC15435 [Homo sapiens] 51 %
8 NM_026613	68201		Dullard homolog (Xenopus laevis)
8 AK021056	77314		hypothetical protein MGC14827 (85% human)
			sp:P46096 - SYT1_MOUSE Synaptotagmin 1 (SYT1) (p65) 38 %

FIGURE 17-4

Cluster Access	Locus	Gene	Description
10 NM_007408	11520	Adip	adipose differentiation related protein
10 AF17202	170742	RBT1	replication protein-binding trans-activator
10 NM_011992	26611	Rcn2	relucobabin 2
10 AK017367	71363		RIKEN cDNA 5430433J05 gene
10 NM_028218	72381		2119399A elongin B [Homo sapiens] 72 %
10 NM_008638	18701	Pigl	phosphatidylinositol glycan, class F
10 NM_020578	57440	Ehd3	EH-domain containing 3
10 NM_007513	11987	Slc7a1	ectotropic retrovirus receptor w1
10 AK009387	65578		RIKEN cDNA 2310018G11 gene
10 AK020739			sulfatase 2
10 AK008108	72043	Sul12	phosphoprotein associated with glycosphingolipid-enriched microdomains
10 NM_053182	94212	Pag	POU domain, class 3, transcription factor 2
10 NM_008898	18992	Pou3f2	RIKEN cDNA 4931431F19 gene
10 AK016497	70860		Similar to Rag C protein [94% Homo sapiens]
10 AK015982	75220		days embryo riken cdna clone:5730521f22
10 AK017781	24051		scinderin
10 NM_009132	20259	Sgcb	polycystic kidney disease (polycystin) and REJ (sperm receptor for egg jelly, sea urchin homolog)-like
10 NM_011105	18766	Scn	mitochondrial translation optimization 1 homolog
10 AF369902	68291	Pklrj	regulatory factor x-associated antyirin-containing protein rhank; adaptor M-1 M1
10 NM_033080	110959	Mit1	DNA segment, Chr 7, Roswell Park 2 complex, expressed
10 NM_011266	19727	Rtkank	DEAD/HH (Asp-Glu-Ala-Asp/Gln) box polypeptide 50
10 NM_053183	94213	Ddx50	PDZ and LIM domain 1 (telin)
11 NM_015861	54132	Polim1	similar to contrapain-like protease inhibitor related protein (CP-23) [Rattus norvegicus]
11 NM_028740		Pdo	piccolo (presynaptic cytomatrix protein)
11 Y19165	26875		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921532D01 product:undassifiable
11 AK014993	70961		Cg10671 like (Drosophila)
11 AK003939	68680	Cg10671	RIKEN cDNA 4930473B18 gene
11 AK015565	75803	Wisp1	WNT1 inducible signaling pathway protein 1
11 NM_018865	22402	Polr2g	polymrase (RNA) II (DNA directed) polypeptide G
11 NM_026329	67710		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700041N15 product:CHEMOKINE-LIKE FACTOR 2 VARIANT 2
11 AK006679		Mix	melanin 1
11 NM_013604	17827	Nrap	nebulin-related anchoring protein
11 NM_008733	17175		sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4A
11 NM_013658	20351	Sema4a	breast cancer metastasis-suppressor 1
11 AF733590	107392	Brrs1	ATPase, class V, type 10A
11 AF156549	11982	Alp10a	Eal1 protein
11 AK016628	74427	Eal1	RIKEN cDNA 3732407C23 gene
11 AK014404	74014		TLH29 protein precursor [Homo sapiens] 63 %
12 AK010014	78933	Cd63	cd63 homologue of cd63/mcd491; antigen clone mgc:7123
12 NM_007853	12512	Gai3	galanin receptor 3
12 NM_015738	14429	Slc5a7	solute carrier family 5 (choline transporter), member 7
12 NM_022025	63993	Slc5a7	mitochondrial solute carrier protein
12 AK019700	67712	Mscp	dyslipidias myotonic kinase, B15
12 NM_032418	13400	Dm15	CGI-30 protein [Homo sapiens] 85 % /
12 AK010475	69740		Mus musculus adult male hippocampus cDNA, RIKEN full-length enriched library, clone:2900024P18 product:hypothetical Profilin/valiengen containing protein
12 AK013595	72871		Similar to CDA14 [92% Homo sapiens]
12 AK016275	67456		divalent cation tolerant protein CUTA [Homo sapiens] 91 %
12 AK002828	67675		

Figure 17-5

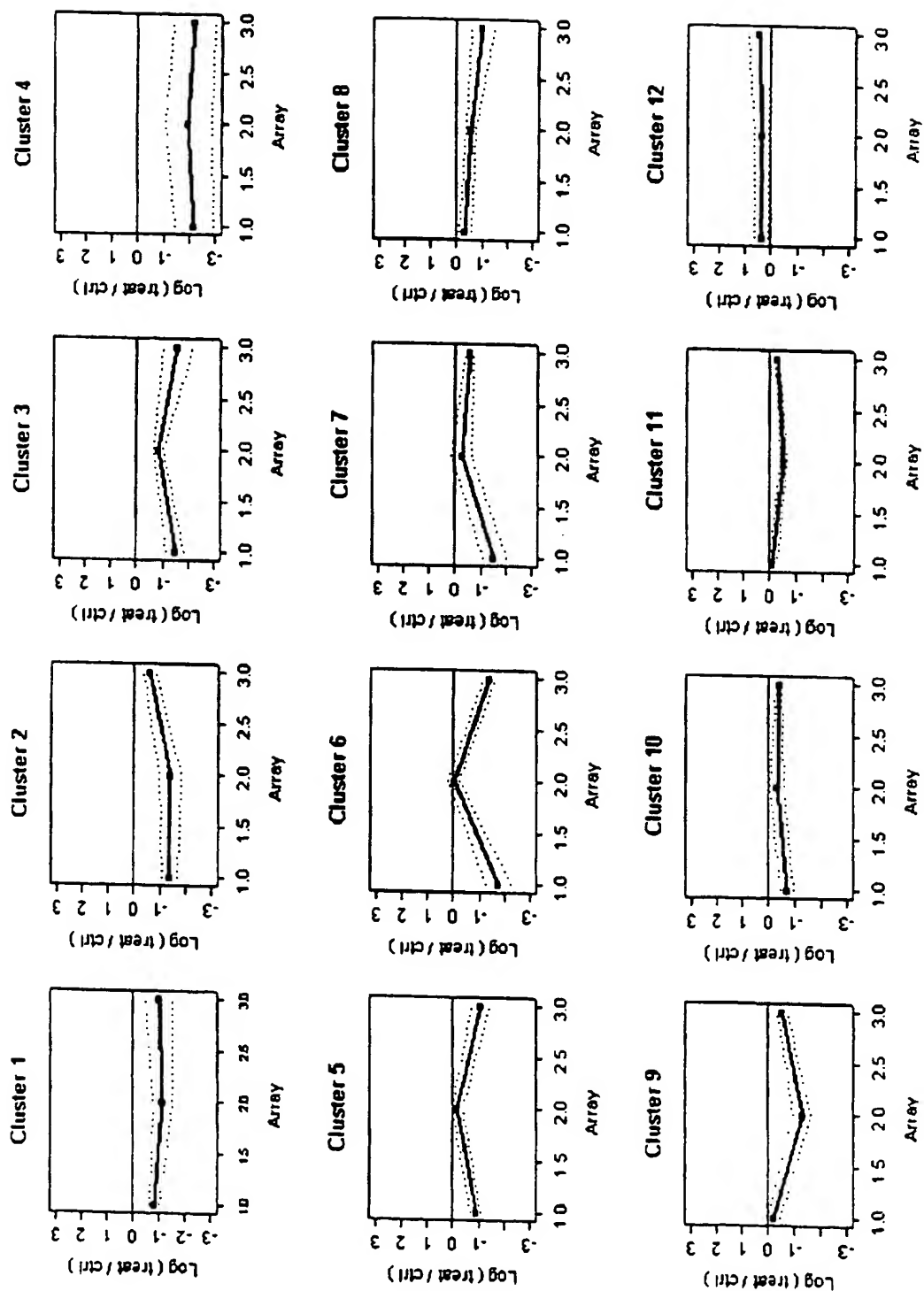


FIGURE 18-1

cluster analysis 1
colon cancer
hypothalamus

Cluster Access	Locus	Gene	Description
1 NM_009789			
1 NM_009871			
1 NM_008678	17978	Ncoa2	glucocorticoid receptor interacting protein grip1 hormone-dependent interaction with hormone binding domains of steroid receptors (transactivation; nuclear coactivator ncoa-2)
1 AK004206	67282		AD15_HUMAN Protein AD-016 (Protein CGL116) (c0009) 90 %
1 AJ131821	11938	Atp2a2	sarcoendoplasmic reticulum ca2+ atpase serca2b
1 AK016996			
1 NM_013747	27277	Golga5	golgi autotantigen, golgin subfamily a. 5 [Mus musculus] 100 %
1 AK007896			
1 NM_020518	57278	Ctst	cortical thymocyte receptor (X. laevis CTX) like
1 NM_020583			
1 NM_033601	12051	Bcl3	B-cell leukemia/lymphoma 3 [Mus musculus] 100 %
1 U22015			
1 AK003826	68530		RIKEN cDNA 1110019L22 gene
1 AK011747			
1 NM_010330	13723	Emn3	embigin
1 NM_011078			
1 AK006571	57344	Cyl19	methyltransferase Cyl19
1 NM_010498	15931	Ido3	iduronate sulfatase ido3
1 AK008991	70137		adult male stomach riken cdna clone:2210420n10
1 NM_008094	14466	Gba	acid beta glucosidase
1 NM_019432			
1 NM_007744	12846	Comt	catechol-o-methyltransferase comt
1 AK009578	71912		
1 NM_019486	56015	Olfir71	olfactory receptor 71 olfr71
1 AK004787			
1 AB041576	58242	Nudt11	nudix (nucleoside diphosphate linked moiety X)-type motif 11
1 NM_007847	12499	Entpd5	ectonucleoside triphosphate diphosphohydrolase 5
1 AK014783	73914	Itih3	interleukin-1 receptor-associated kinase M (73% human)
1 NM_008622	17527	Mpv17	mpv17
1 NM_018888	56046	Bizb	basic FGF repressed, Zic binding protein
1 AK007941			
2 NM_011246			
2 NM_015753	24136	Zfx1b	zinc finger homeobox 1b zfx1b
2 AK008168			
2 AK009137	74182		RIKEN cDNA 2310032D16 gene
2 AK007598			
2 BC012251			
2 NM_017465			
2 NM_008656			
2 NM_008896			
2 AK017510			
2 NM_008675	17965	Nbl1	neuroblastoma, suppression of tumorigenicity 1
2 AK018579	78924		ref:NP_038605.1 - L1 repeat, Tf subfamily, member 30 [Mus musculus] 77.97 %
2 AK010304			
2 AF282304			
2 AF108906			
2 NM_020619	57377	Gcs1	glucosidase 1
2 NM_002286	20865	Sh2	sulfolipase, hydroxysteroid preferring 2
2 AK018335			
3 AK003880	68647		product:hypothetical Hisidine-rich region containing protein
3 NM_022028			
3 AK021006			
3 AK019361	110920	Sich	stress 70 protein chaperone, microsome-associated, human homolog
3 NM_020603			
3 AK013367			
3 AK017789	70661		SN1L_HUMAN Probable serine/threonine protein kinase SNF1LK (55% human)
3 AK016515			
3 AK004956	71758	Ndufa3	T00335 hypothetical protein KIAA0564 - human (fragment)(89% human)
3 AK008243	66091		NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3
3 NM_073537	69908	Rab3b	RAB3B, member RAS oncogene family
3 AK017676			

FIGURE 18-2

cluster analysis I
colon cancer
hypothalamus

3 NM_020585	57437		HSPC041 protein [95% Homo sapiens]
3 AK013245	72748		hypothetical protein MGC12904 [77% Homo sapiens]
3 NM_019791			
3 NM_026411			
3 AB016502			
3 NM_025785			
3 AF359382			
3 NM_013500	30050	Mit2	antigen p97 (melanoma associated) identified by monoclonal antibodies 133.2 and 96.5
3 NM_021458	14365	Fzd3	fizzled homolog 3 (drosophila fz3)
3 AF203781	20286	Msr1	macrophage scavenger receptor type 1; s-a
3 NM_013732			
3 NM_011200	19243	Ptp4a1	protein tyrosine phosphatase type 1a member clone mgc:5901; pti-1
4 AK004809	240880		RIKEN cDNA 1200018D23 gene
4 NM_025592			
4 AK016340			
4 NM_007995	14133	Fcna	fictin A
4 NM_008133	14661	Gud	glut glutamate dehydrogenase
4 NM_029838			
4 AK015090			
4 BC004027			
4 AK016475			
4 AF240460	65115	Bean	brain expressed, associated with Nedd4
4 NM_010451	15399	Hoxa2	homeobox protein hox-1.11
4 NM_009266			
4 NM_009072	19878	Rock2	Rho-associated coiled-coil forming kinase 2
4 AK016822			
4 NM_011287	19896	Rpl10a	clone mgc:7602; csa-19
4 AK011810			
4 NM_007837	13198	Ddl3	chop-10
4 AK012394	114896	Alg31	AFG3(ATPase family gene 3)-like 1 (yeast)
4 NM_026305			
4 NM_017032	26943	Tde1	membrane protein lms-1
4 BC006040			
4 BC005625			
4 AK004783			
4 NM_031184	83396	Gli5	kuppel-like zinc finger protein gli52 related to gli subfamily; gli-kuppel zinc-finger ntl mtdl transcription factor
4 BC002151			
4 AK011356			
4 NM_008228	20648	Snai1	synaptrophin, acidic 1
4 NM_018758			
4 NM_023066	65973	Asph	aspartate-beta-hydroxylase asph; aspartyl beta-hydroxylase
4 NM_007674	12592	Cdx4	caudal type homeo box cdx4
4 AK011950			
4 NM_011251	19654	Rbm6	RNA binding motif protein 6
4 AK017955	60315	Myo1	melanocyte proliferating gene 1
4 NM_007656	12521	Kai1	c33/2/ia4 homologue of the c33 antigen a target mebsinhibitory to hiv-1 induced syncytium formation
4 NM_013597	17258	Mei2a	myocyte enhancer factor 2a mei2a
4 AF213391	27417	Abcb8	17 days embryo head like cDNA clone:3222401p09; alp-binding cassette protein abcb8
5 NM_011948			
5 NM_025921			
5 AF226663	231841		unknown
5 NM_029813			
5 BC004098			
5 NM_030750	81535	Sgpp1	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
5 NM_016681	50883	Chk2	CHK2 checkpoint homolog (S. pombe)
5 NM_009632	11546	Adpr2	adp-ribosyltransferase nad+ poly adp-ribose polymerase adpr2; 2 pamp2 pamp-1-like protein pamp-2
5 BC002120			
5 AK009282	71897		RIKEN cDNA 2310010M24 gene
5 AK016303			
5 AK018458	71519	Cyp2u1	Cytochrome P450, family 2, subfamily u, polypeptide
5 AB041660	230991		brain cDNA clone mncb-3966 unnamed protein product
5 AJ290392			
5 AK009071			

FIGURE 18-3

5 NM_020493	12421	Cc1	cc1 coiled-coil protein nuclear, partial txp180
5 NM_009826	170717		CAMP [Mus musculus] 100 %
5 AF119384			
5 AK005862	22678	Zfp2	zinc finger protein 2 zfp2; msz187
5 NM_009550			
5 NM_007863	78558		adult male urinary bladder riken cdna clone:353008 lk03
5 AK020653	75185		RIKEN cDNA 4930542N07 gene
5 NM_029189			
5 NM_025938			
5 AK005930			
5 NM_019925	56696	G2a	g protein-coupled receptor g2a g2a
6 AK003305	68453	Gqphbp1	GPI-anchored HDL-binding protein 1
6 AK019863	77634		small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]
6 BC002148			
6 AK020723	77764		2004395A melanin-concentrating hormone (100% Mus musculus)
6 X59289	213742	Xist	inactive X specific transcripts, gene with no protein product
6 NM_031160			
6 AK016299	75894		KIAA0547 gene product [80% Homo sapiens]
6 NM_010591	18348	Olfir49	olfactory receptor 49 olfr49
6 AK011036	66230	Mips28	mitochondrial ribosomal protein S28
6 NM_012053	26961	Rof8	ribosomal protein L8
6 AK015972	75137		hypothetical protein FLJ10656 (35% human)
6 NM_010484	15567	Sic6a4	serotonin transporter Sert neurotransmitter; encoding serotonin
6 NM_026164	67452	Ipla2	intracellular membrane-associated calcium-independent phospholipase A2 gamma - RIKEN cDNA 1200006019 [Mus musculus] 100 %
6 NM_010174			
6 NM_009135	20284	Scrg1	scrapie responsive gene 1
6 AK009937	71941		hypothetical protein FLJ12118 [77% Homo sapiens]
6 AK019863	77634		small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]
6 AK008518	69893		
6 AK009355			
6 AK010014	76933		TLH29 protein precursor [Homo sapiens] 63 %
6 NM_011930	26373	Cten7	putative chloride channel protein ctc7 mdc7 nmcdc7
6 AK006388			
6 AK010472	69747		RIKEN cDNA 2410012H22 gene
6 NM_013935	30963	Ptpa	protein tyrosine phosphatase-like (proline instead of catalytic arginine), member a
6 NM_011401	20527	Sic2a3	gluc3 encoding glucose transporter, exon 10
6 BC002098	220591		RIKEN cDNA 1810011K17 gene
6 NM_009818	12385	Calna1	catenin alpha 1
6 NM_026065	67270		mitochondrial ribosomal protein L42 [Homo sapiens] 76 %
6 NM_018819			
7 NM_009129	20254	Scg2	secretogranin II
7 NM_011248	19649	Rbg1	retinoblastoma inhibiting gene 1
7 NM_019985	56760	Clec2	10 day old male pancreas riken cdna clone:1810061113; c-type lectin-like receptor 2 dec2
7 NM_009426			
7 NM_019631	56277		19.5 m32486
7 AK006440	75564		RIKEN cDNA 1700027N10 gene
7 NM_018937	58706	Ccn1	cyclin L1
7 BC005568	75689		RIKEN cDNA 2310056K19 gene
7 NM_025446			
7 NM_007833	12447	Cone1	cyclin e cone
7 NM_021344	57816	Tesc	testes cell
7 NM_007676			
7 NM_025617	66526		RIKEN cDNA 2210012G02 [Mus musculus] 100 %
7 NM_010934	18166	Noylr	neuropeptide y receptor y1
7 NM_009714	11889	Aspr1	balbic asialoglycoprotein receptor mbh-1; aspr1
7 NM_011519	20969	Sdc1	syndecan 1
7 NM_010345	14783	Grb10	growth factor receptor bound protein grb10
7 NM_031842	83797	Smad3	SMAD3 related, matrix associated, actin dependent regulator of chromatin, subfamily d, member 1
7 AK002303			
7 NM_016877	53621	Cnol4	CCR4-NOT transcription complex, subunit 4
7 NM_013790	27416	Abcc5	ATP-binding cassette, sub-family C (CFTR/MRP), member 5
7 AK013833			
7 AK006173			

FIGURE 1B-4

cluster analysis I
colon cancer
hypothalamus

7 AK015245	74626		RIKEN cDNA 4930429Q20 gene
7 BC004630	216549	Ssg1	hypothetical protein FLJ20080 [Homo sapiens] 78.35 %
7 AK011256	67896		steroid sensitive gene 1
7 AK011405			
7 NM_009711	11876	Atm	atentin
7 NM_008197	14958	H110	h1 histone family member clone mgc-6248; h110
7 NM_010788	17257	Mecp2	methyl cpb binding protein 2
7 AK010201	69687		CGI-127: yypce protein [100% Human]
7 NM_025749			
8 NM_008390	21892	Tti	toloid-like
8 NM_008740	18195	Nsf	skd2 nem-sensitive fusion protein nsf swiss-prot accession number p18708; n-ethylmaleimide sensitive factor clone mgc-11511
8 NM_009091	20054	Rps15	ribosomal protein s15 rps15
8 NM_030733	81008	Gpr63	G protein-coupled receptor PSP24-2 [Mus musculus] 100 %
8 AK003895			
8 AB039933			
8 NM_031168	16193	Il6	interleukin il6
8 AK020538	77397		Lysozyme C: type M precursor (1,4-beta-N-acetylmuramidase C) (82% Mus musculus)
8 AK013267	72747		RIKEN cDNA 4930560E09 (Mus musculus 25 %)
8 AK002386			
8 AJ307670	117224		KIA0298 hypothetical protein (human)-ribosomal protein L27a-suppression of tumorigenicity 5
8 AK006786			
8 NM_025448	66256	Ssr2	signal sequence receptor, beta
8 NM_011500	268980	Sirn	striatin, calmodulin binding protein
8 AK002703			
8 AF090911	12005	Axin	axin
8 NM_019547			
8 NM_018805	54710	Hs3a3b	d-glycosaminyl 3-o-sulfotransferase-3b 3-ost-3b
8 NM_007502	11933	Alp1b3	alk-alpase beta-3 subunit alp1b3
8 NM_024201			
8 NM_021565	59090	Midin	midnolin
8 AK014396	74020	Cpn4	copine IV
8 NM_010561			
8 NM_010422	15212	Herb	129sv beta-n-acetylhexosaminidase herb; beta-hexosaminidase beta subunit
8 NM_008712	18125	Nos1	nitric oxide synthase 1, neuronal
8 NM_009783			
8 NM_019404			
8 AK004506	68942		T12468 hypothetical protein DKFZp564O123.1 - human 97 %
9 AK014319			
9 NM_008508			
9 NM_023587			
9 NM_023788			
9 NM_020578			
9 NM_011665			
9 NM_021541	12958	Cyha2	day neonate eyeball riken cDNA clone:e130107m19
9 AB033615	224860	Pcd2	phospholipase C-like 2
9 NM_007915	13663	El24	eliposide induced 2.4 mRNA
9 NM_011870	23991	Cb1	calcium and integrin binding 1 (calmyrin)
9 NM_008344	16012	Igf6p6	insulin-like growth factor binding protein 6 igfbp6
9 AK007819	69822		RIKEN cDNA 1810047P18 gene
9 NM_015731	11891	Alp9a	pulative e1-e2 alpase sw:ye8-yeast p40527 probable yit048w
9 NM_021291	30962	Sic7a9	solute carrier family 7 (cationic amino acid transporter, y+ system), member 9
9 AK018605	78799		reticulon 1; neuroendocrine-specific protein (62% human)
9 NM_011643	22053	Trtp1	trtp1 alpha
9 AK003676	68581	Tmp21	transmembrane trafficking protein
9 AK017509			
9 BC006051	20787	Sreb1	sterol regulatory element binding protein srebp1; clone image:3590844
9 NM_025424			
9 AK012054	72519		T50621 hypothetical protein DKFZp762O076.1 - human (fragment)(96% human)
9 AK005786	69347		RIKEN cDNA 1700129C05 [Mus musculus] 41 %
9 AK010939			
9 NM_007528	12029	Bazf	bcl6-associated zinc finger protein bazf
9 AK017033	74472		RIKEN cDNA 4933433C11 gene
9 BC006063			

FIGURE 18-5

9 AK009557	69692	Garg3	CGI-130 protein [71% Homo sapiens]
9 NM_008074	14407		gamma subunit of the gaba-alpha receptor
9 AK009517	75580		zinc finger protein 205 (32% human)
9 NM_015676	19325	Rab10	RAB10, member RAS oncogene family - RB10_HUMAN Ras-related protein Rab-10 100 %
9 NM_026242			
9 NM_008557	17178	Fxyd3	fxyd domain-containing ion transport regulator 3 fxyd3
9 NM_009194	20496	Sic12a2	solute carrier family 12 member 2 sic12a2
9 NM_022030	64051	Sv2a	synaptic vesicle glycoprotein 2 a
9 NM_023290	64051	Mkn2	makorin, ring finger protein, 2; Makorin RING zinc-finger protein 2 [Mus musculus]
9 BC016444	15373	Hmw3	adult male liver riken cDNA clone:1300017a15
9 NM_030685	28146	D3Ucl91	DNA segment, Chr. 3, University of California at Los Angeles 1
9 AB047820			
9 NM_023805			
9 AJ292072	192160	Mln51	MLN51 protein
9 NM_026982	74525	Sic31a2	RIKEN cDNA 8430419L09 gene
9 NM_025266	20530	Cacna1i	solute carrier family 31 member sic31a2
9 AY026384	192655		calcium channel, voltage-dependent, alpha 1I subunit
9 AK006275	224671		BTB (POZ) domain containing 1 [Homo sapiens] 26.88 %
10 AK016487	70989	Has3	RIKEN cDNA 4931429111 gene
10 NM_008217	15118		hyaluronan synthase 3 has3
10 NM_025839	66911	Tm43f1	hypothetical protein MGC11275; likely ortholog of mouse syndesmos [95% Homo sapiens]
10 NM_008536	17112	Tiaf1	transmembrane 4 superfamily member 1
10 AB026497	21842	Men1	myosidc myosin containing ptd domain
10 NM_008583	17283		menin men1
10 AK017309	71382	Pex1	peroxisome biogenesis factor 1
10 NM_007419	11554	Adri1	18 days embryo lung riken cDNA clone:8430404d20; beta-1 adrenergic receptor
10 NM_011670	22223	Uchl1	ubiquitin carboxy-terminal hydrolase L1
10 NM_010134	13799	En2	engrailed 2
10 AK007485			
10 NM_015819			
10 NM_008479	16768	Lag3	lymphocyte activation gene 3
10 NM_011705	22367	Vrk1	vaccinia related kinase 1
10 BC002230			similar to hypothetical protein FLJ10008 [Homo sapiens]
10 NM_030678	14936	Gys1	glycogen synthase 1, muscle
10 NM_009785	12294	Cacna2d3	calcium channel, voltage dependent, alpha2/delta subunit 3
10 NM_007814	13080	Cyp2b19	Cytochrome p450 2b19 cyp2b19
10 NM_019503	56188	Fxyd1	FXYD domain-containing ion transport regulator 1
10 AK014025	67285	Sdccc910	serologically defined colon cancer antigen 10
10 NM_010202			
10 NM_019817	56447	Copz1	copz1 nondaltrin coal protein zeta-cop
10 AB047557			
10 NM_025766	66784	Pqgb	RIKEN cDNA 4933439F11 [100% Mus musculus]
10 NM_008906	19025		protective protein for beta-galactosidase
10 NM_009343	21652	Phf1	PHD finger protein 1
10 NM_009334	21419	Tcfp2b	transcription factor ap-2 beta tcfp2b
10 NM_019873	56299	Flppl	FK506 binding protein-like
10 NM_030726	80978	Gpr90	G protein-coupled receptor 90
10 NM_030258	80290		hypothetical protein, MGC:7035; hypothetical protein MGC7035 [Mus musculus] 100 %
10 U69136	12565	Cdh9	Cadherin
10 AK016847	73845		A55575 ankryrin 3, long splice form - (28.61% human)
10 NM_018758	57267	Apha3	amyloid beta (A4) precursor protein-binding, family A, member 3
10 NM_015766	50498	Ebi	Epstein-Barr virus induced gene 3
10 NM_010610	16531	Kcmae1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1
10 AK014760	75770		RIKEN cDNA 4833424K13 gene
10 AK012248	72322	Xpo5	exporin 5
10 NM_025397	66172		RIKEN cDNA 1110030J09 [Mus musculus] 100 %
10 BC011482			
10 NM_010231	14261	Fmo1	favin containing monooxygenase 1
10 AK013636	72938		Similar to HSPCO34 protein [75% Homo sapiens]
10 AK020222	77505		RIKEN cDNA 8030491N06 gene
10 NM_020292	258755	MOR12-4	olfactory receptor MOR12-4 - odorant receptor S46 gene [Mus musculus] 97 %
10 AK015166	74902		plecln 1, intermediate filament binding protein, 500KD [Homo sapiens] 25.74 %
10 NM_053194	101489		synebrin

10 AK035156
10 AK017501
10 NM_007
10 NM_00898
11 NM_03333
11 NM_0206
11 NM_0101
11 NM_0205
11 NM_0235
11 NM_0081
11 NM_0081
11 BC00401
10 AK00501
11 AK01240
11 NM_01003
11 AK01578
11 AK01427
11 NM_0254
11 M35732
11 NM_0066
11 AK02144
11 NM_01059
11 NM_01191
11 AB04435
10 AK01370
11 NM_02313
11 NM_01968
11 NM_03122
11 AK00956
11 AKG0563
11 NM_01075
11 ABD1649
11 AF12742
10 AK02037
11 AKO194
11 AK00666
11 AKO15207
11 AF320126
11 AKQ03912
11 NM_05406
11 NM_01964
11 BC016224
11 AK007346
11 NM_01032
11 NM_01376
11 AKO13983
11 NM_02578
11 NM_02156
12 AKO15565
12 AKO15525
12 AKO06972
12 BC004752
12 AKO14393
12 NM_022033
12 NM_021495
12 NM_010184
12 BC005563
12 AKO16662
12 AF321236
12 AKO15757
12 NM_007603
12 AKO07235
12 NM_007875
12 NM_026906

cluster analysis 1
colon cancer
hypothalamus

FIGURE 18-7

12 NM_021451	58801	Ptmap1	phorbol-12-myristate-13-acetate-induced protein 1; Nova protein [Mus musculus] 100 %
12 L24755	12153	Brip1	bone morphogenetic protein 1
12 NM_023455	68396	Cnld	putative N-acetyltransferase Camello 4; RIKEN cDNA 0610037016 gene [Mus musculus] 100 %
12 NM_018780	54612	Sirp5	secreted frizzled-related sequence protein 5
12 AK016148	75342		RIKEN cDNA 4930556J24 gene
12 NM_018815	54563	Nup210	nuclear pore membrane glycoprotein 210 pom210
12 NM_013922	30944	Zip354c	zinc finger protein 354c
12 AK015107	73937		RIKEN cDNA 4930406E24 gene
12 AK014568	74035	Lia	lymphotxin A
12 NM_010735	16992	Clec3f6	C-type (calcium dependent, carbohydrate recognition domain) lectin, superfamily member 6
12 NM_011959	26888	Msx3	msx3 like drosophila melanogaster muscle segment homeobox msh protein encoded by genbank accession number U33319
12 NM_010836	17703		

Figure 18-8

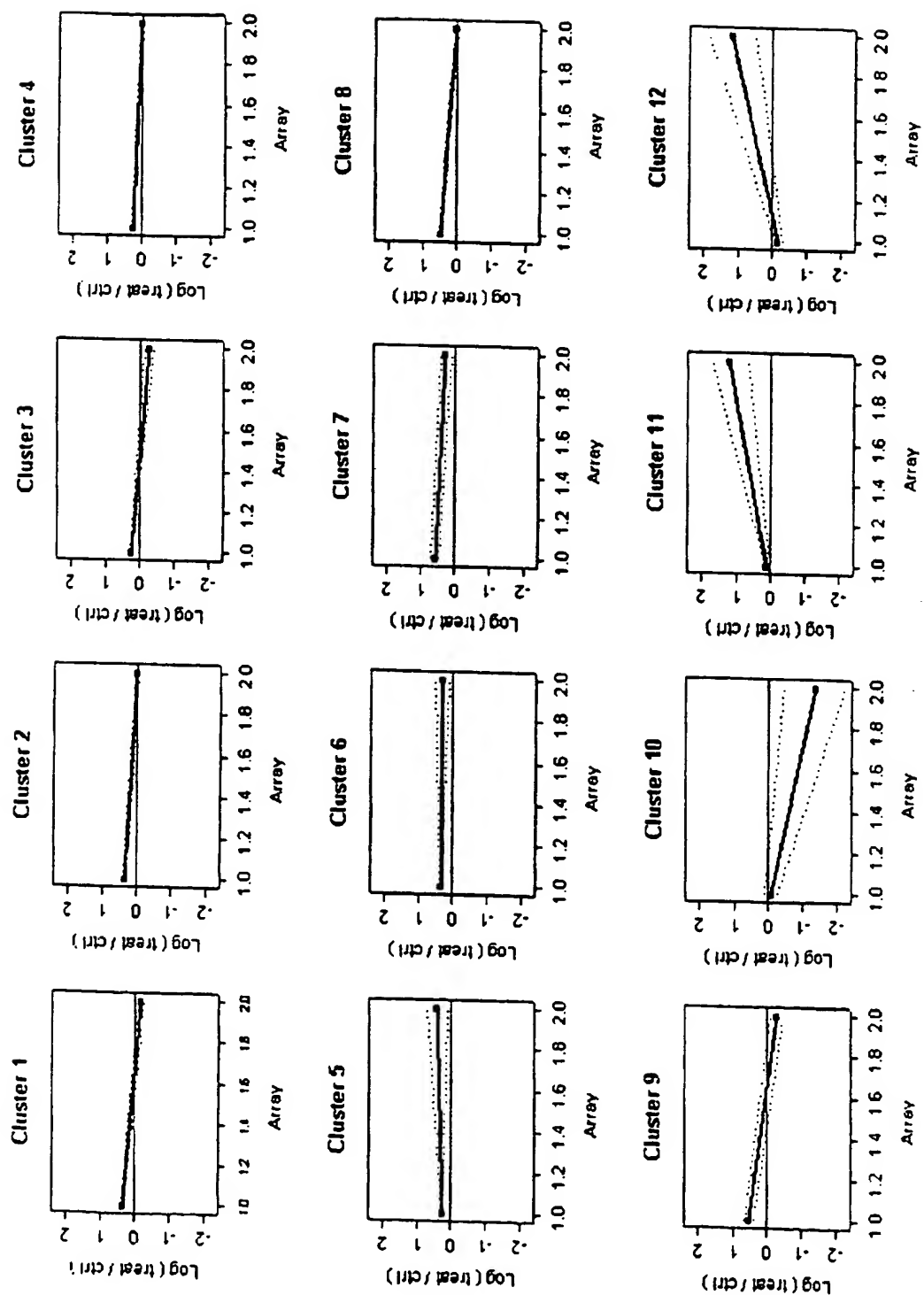


FIGURE 19-1

Cluster	Access	Locus	Gene	Description
1	NM_080428	50754	Fbxw7	F-box and WD-40 domain protein 7, archipelago homolog
1	AK016707	74420		RIKEN cDNA 4933406F04 gene
1	AK009086	69533		similar to keratin associated protein 4.7 [31% Homo sapiens]
1	NM_009420	22024	Tpx1	testis specific gene 1
2	NM_030713	60802	Zfp202	zinc finger 202 m1 znf202 scan-krab-zinc protein znf202-m1
2	NM_019478	28849	Olfir159	olfactory receptor 159
2	AK013166	67607		Similar to 148668 zinc finger protein 51 - mouse 43%
3	AK011654	70420		Mus musculus 10 days embryo whole body cDNA, RIKEN full-length enriched library, clone:2610034B18 product: hypothetical protein
3	NM_010010	13116	Cyp46	cytochrome P450, family 46, subfamily a, polypeptide 1
3	NM_021704	20315	Cxcl12	chemokine (C-X-C motif) ligand 12, 181182 cytokine - mouse 100 %
3	NM_022427	64378	Gpr88	G-protein coupled receptor 88
3	NM_013415	11932	Alp1b2	alopase na+/K+ transporting beta 2 polypeptide
4	NM_008177	14829	Gpr	gustin releasing peptide receptor gpr
4	NM_009211	20588	Smorcc1	SWI/SNF related, matrix associated, actin dependent regulator of chromatin, subfamily c, member 1
4	AK004401	71797		chondroline 4-sulfotransferase [Mus musculus] 47 %
4	AF415213	20688	Sphk1	sphingosine kinase 1
5	NM_016849	54131	Irf3	interferon regulatory factor-3 Irf3; factor 3
5	NM_027170	69696		JC6547 high sulfur protein B2E - rat 37 %
5	AK007868	72056		mucin 10, submandibular gland salivary mucin [Mus musculus] 30 %
5	NM_022024	63986	Gmfg	gila maturation factor, gamma
5	AK005678	321010		RIKEN cDNA 1700006J14 gene
6	NM_007986	14089	Fap	fibroblast activation protein
6	AK005166	76500		Similar to mammalian inositol hexakisphosphate kinase 2 [Homo sapiens] 91 %
6	NM_009214	20603		spermine synthase
6	NM_030553	80706	Olr160	Olr160
7	NM_022007	57180	Iryd7	FXYD domain-containing ion transport regulator 7
7	AK017362	75736		BCL2-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
7	NM_026309	67678		LSM3_HUMAN U6 snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
7	AF285585	30054	Rnf17	ring finger protein 17
8	NM_010351	14836	Gsc	goosecoid gsc
8	AK017271			RIKEN full-length enriched library, clone:5430405H02
8	NM_021368	58168	Ors16	odorant receptor 16
8	AK010800	76797		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
8	NM_013706	23833	Cd52	CD52 antigen
9	AK020617	66825		ref NP_061935.1 - hypothetical protein FLJ20225 [Homo sapiens] 68 %
9	NM_030701	60863	Puma-g	putative seven transmembrane spanning receptor puma-g
10	AK018444	52504		expressed sequence A146222
10	NM_008814	12373	Catsq2	cathepsin 2
10	NM_019565	56709	Dhjb12	mdj10 deduced amino acid sequence of is homologous to c. elegans putative dsaj protein z73102 b0035.14. homolog
10	M20585	224756	H2-M1	histocompatibility 2, M region locus 1
11	AK008108	72043	Sulf2	sulfatase 2
11	NM_007645	12493	Cd37	leukocyte surface antigen cd37
11	M12289	17885	Myh8	perinatal skeletal myosin heavy chain 3 and
11	AK020915	67245	Pel1i	pellino 1 - ref NP_075813.1 - pellino 1; RIKEN cDNA 281048L03 gene [Mus musculus] 100 %
11	NM_010589	16409	Kcnab3	potassium voltage-gated channel, shaker-related subfamily, beta member 3
11	NM_011148	19023	Ppel2	protein phosphatase, EF hand calcium-binding domain 2
11	AF276974	192201		RIKEN cDNA 9230106L14 gene
11	NM_021516	17169	Mprk3	EPAS3_MOUSE Ephrin type-A receptor 3 precursor (Tyrosine kinase receptor ETK4) 100 % - MAP/microtubule affinity-regulating kinase 3, ELKL motif kinase 2 long form [Mouse] 100 %
12	NM_007770	12951	Crx	homeodomain protein crx homeobox
12	AK018496	66817		9030409E16RIK RIKEN cDNA 9030409E16 gene
12	AK007540	69769		hypothetical protein FLJ23467 [Homo sapiens] 83 %

Figure 19-2

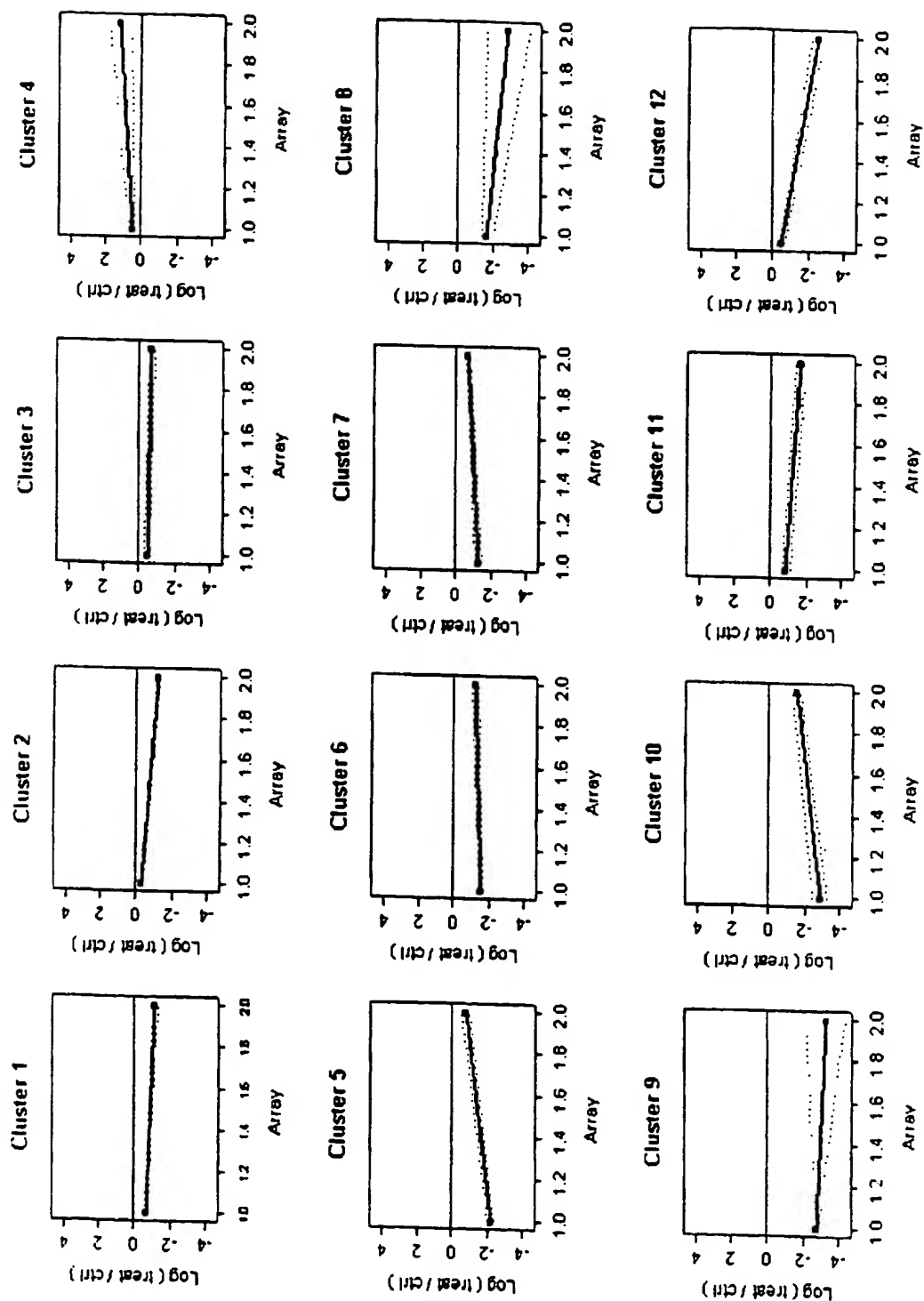


FIGURE 20-1

Cluster	Access	Locus	Gene	Description
1	AK004068	65184		RS4_HUMAN 40S ribosomal protein S4, X isoform (Single copy abundant mRNA protein) (SCR10) 93 %
1	BC004027			adult male small intestine riken cdna clone:201032016: mrp33 mitochondrial ribosomal protein l3 l3mt
1	BC011128	94062	Mrp3	etoposide induced 2.4 mRNA
1	NM_007915	13663	E24	fizzled homolog 3 drosophila fz03
1	NM_021458	14365	F403	
1	NM_013789			
1	AK003808			
1	AF057287			
1	AK003564			
1	NM_020510	57265	Fz02	fizzled homolog drosophila fz010
1	NM_013899	30059	Timm13a	translocase of inner mitochondrial membrane 13 homolog a (yeast)
1	NM_030691	80719	Igs16	immunoglobulin superfamily member Igs16
1	NM_022889	64934	Pes1	pescadillo homolog containing bcr1 domain zebrafish pes1
1	NM_019769			lympholactin
1	NM_008510	16963	Scyc1	
1	NM_024267			adult male liver riken cdna clone:1300017a15
1	BC016444	15373	Hmx3	
1	AK005731			
1	AK017308			
1	NM_023066	65973	Asph	aspartate-beta-hydroxylase asph; aspartyl beta-hydroxylase
1	NM_010231	14261	Fmo1	flavin containing monooxygenase 1
1	NM_020565	57430	Suli-x2	sulfotransferase-related protein SUL-T-X2
1	AJ293897			estrogen receptor beta esrb erbata; esr2
1	NM_010157	13983	Esr2	
1	AK021152			Zinc finger protein 68
1	NM_013944	24135	Zfp68	
1	AF265577			
1	NM_053186			
1	AK009205			
1	NM_011986			
1	NM_016773	53322	Nucb2	nucleobindin 2
1	AK002981			
1	NM_009242	20692	Spac	17 days embryo head riken cdna clone:3200001111: cysteine-rich glycoprotein sparc aa 1-302
1	NM_010412	15184	Hdac5	histone deacetylase 5 hdac5 class ii
1	NM_011835	23924	Katna1	lipoprotein hormone-sensitive lipase hsl-interacting protein
1	NM_025921			
1	NM_021336			
1	NM_025436			
1	NM_019432			
1	NM_016709			
1	NM_013945			
1	AK006525	26563	Ror1	receptor tyrosine kinase-like orphan ror1 - ROR1_MOUSE Tyrosine-protein kinase transmembrane receptor ROR1 precursor (Neurotrophic tyrosine kinase 100 %
1	NM_011221			
1	AK010472	69747		RIKEN cDNA 2410012H22 gene
1	NM_009759	12169	Bmx	BMX non-receptor tyrosine kinase
1	NM_010451	15399	Hoxa2	homeobox protein hox-1.11
1	AK009836			
1	NM_025295			
1	AF169286			
1	NM_008139	14682	Gnaq	G alpha q subunit
1	NM_010289	14610	Gip10	gap junction membrane channel protein alpha 10
1	BC005786			
1	NM_011109	17782	Pla2g2d	phospholipase A2, group IID
1	AK010452			
1	AB035381			
1	NM_009694			
1	AK012054	72519		T5062.1 hypothetical protein DKFZp762O076.1 - human (fragment)(96% human)
1	NM_020515	57272	Ora16	gene for odorant receptor A16
1	NM_020597	17695	Msmb	beta-microseminoprotein; beta-inhibin; prostatic inhibin protein (Mus musculus)
1	NM_011035			
1	NM_009091	20054	Rps15	ribosomal protein s15 rps15
1	NM_026592			
1	X12504			
1	NM_010080	13517	Dspp	dentin sialophasphoprotein

FIGURE 20-2

cluster analysis I
breast cancer
hypothalamus

Cluster Access	Locus	Gene	Description
1 AK020653	78558		adult male urinary bladder riken cdna clone:9530081403
1 NM_080433			
1 AK016362	71468	Obox-1	oocyte specific homeobox 1
1 AK015384			
1 AK010084			
1 NM_011656			
1 AK019752	22325	Vav2	vav2 oncogene
1 NM_009500			
1 NM_008485	16782	Lamc2	laminin, gamma 2
1 NM_007495	11699	Asin1	asiotactin neuronal migration protein gc14
1 AK018386			
1 AK012283	72569		RIKEN cDNA 2700023J09 gene
1 AF220395	22670	Trim26	tripartite motif protein trim26 alpha
1 NM_011216	19277	Ptpro	protein tyrosine phosphatase, receptor type, O
1 BC003203	104479		simple repeat sequence-containing transcript [28% Mus musculus]
1 NM_008996	19324	Rab1	RAB1, member RAS oncogene family
1 NM_018515	56183	Ntnu	neuromedin
1 AK005056			
1 AK007941			
1 AK009330			
1 AK006724	14939	Gzmb	granzyme B
1 NM_013542			
1 NM_026312			
1 AK005095			
1 NM_009573	22771	Zic1	zinc finger protein of the cerebellum zic1
1 AK005200	68271		RIKEN cDNA 4930441014 gene
1 NM_028649			
1 NM_007753	78733		- 138487 faslin - human 51.90 %
1 AK021408			
1 AK004155			
1 NM_030555	80752		hypothetical protein, BC004044; hypothetical protein MGC7673 [Mus musculus] 100 %
1 NM_025424			
1 NM_031375	83485	Ngrn	f58gm upregulated w ¹¹ ; neurite growth in neuroblastoma cells; mesenchymal stem cell protein dsc92 clone mgc:7646
1 NM_007685			
1 AK011461			
1 NM_025989	15900	kcsbp	interferon consensus sequence binding protein 1
1 NM_008320			
1 AK010336			
1 AK018054	76103		A30411 synapsin Ia - 34% rat
1 NM_020564	57429	Sulf-x1	sulfotransferase-related protein SULT-X1
1 AK010386	71981		RIKEN cDNA 2410004F06 gene
1 NM_011068	18631	Pex11a	peroxisomal biogenesis factor 11a
1 AK003496	73833		T08875 hypothetical protein DKF Zp564F0522.1 - human (fragment) 49 %
1 NM_017465			
1 NM_009190	20479	Vps4b	skd1 protein putative atpase non-sensitive fusion nsf swiss-prot accession number p18708 cdc48p pir a39977 pos: vacuolar sorting 4b yeast clone mgc:6072
1 NM_011430	20618	Sncg	synuclein gamma sncg
1 AK004688			
1 AK015938			
1 AK009332			
1 AK018052			
1 NM_025533			
1 AK017705	70573		hypothetical protein FLJ105560 [82.88Homo sapiens]
1 NM_011601			
1 NM_019477			
1 BC017625			
1 NM_008041			
1 NM_008742	18205	Nif3	ni-3 neurotrophin-3
1 AK014861	70894		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921510J17 product: hypothetical EF-hand containing protein
1 Y11505	20731	Spink4	ISK4_MOUSE Serine protease inhibitor Kazal-type 4 precursor (Peptide PEC-60 homolog) (MIPGC60 protein 100 % / erythrocyte protein band 4.1-like 3
1 NM_013813	13823	Epb4.113	Similar to 148208 zinc finger protein 30 - mouse 44%
1 AK014610	74352		CGI-127; vjasee protein [100% Human]
1 AK010201	59687		cytochrome c oxidase, subunit VI a, polypeptide 2
1 NM_009943	12862	Co6a2	progesterone membrane binding protein [75% Homo sapiens]
1 AK014543	70804		

FIGURE 20-3

Cluster	Access	Locus	Gene	Description
1	NM_019744	27057	Ncoad	nuclear receptor coactivator 4
1	AF145593			
1	AK013453	72815		RIKEN cDNA 2810489J07 gene
1	AK016622			
2	AK002747	71685		hypothetical protein FLJ12691 [81% Homo sapiens]
2	BC010495			
2	AK007640	46501		HSPC166 protein [Homo sapiens] 89 %
2	NM_028227	72398	Brp	BRCA1 associated protein
2	NM_011857	23965	Od23	odd outlier-m homolog 3 <i>Drosophila</i> odc3
2	BC006782	70767		T50839 U4/U6 small nuclear ribonucleoprotein hPrp3 [imported] (99% human)
2	AK019744			
2	NM_026330	67711		RIKEN cDNA 2510027N19 [Mus musculus]
2	NM_026260	67590		
2	AK015947	68195		ribonuclease 6 precursor [Homo sapiens] 67 %
2	NM_008035	14276	Fok2	lolate binding protein 2 (obp2)
2	AK006864	16578	Ki19	kinesin family member 9
2	AK016803	71066		HSE4 MOUSE Heat shock factor protein 4 (HSF 4) (Heat shock transcription factor 4) (HSTF 4) (mHSF4) 33 %
2	AK004768	71720	Osbp3	oxysterol binding protein-like 3
2	NM_008409	16431	lim2a	integral membrane protein 2A
2	NM_020270	56807	Scamp5	secretory carrier membrane protein 5 scamp5
2	NM_009161	20391	Sgca	sarcoglycan, alpha (dysliprin-associated glycoprotein)
2	AK004171	68782		sushi-repeat protein [Homo sapiens] 93 %
2	AK020972			
2	NM_009727	11980	Alp8a1	chromaffin granule ATPase 8 homolog bos taurus encoded by genbank accession number u51100
2	NM_025273	13180	Pcd	6-pyruvoyl-tetrahydropterin synthase/dimerization cofactor of hepalocyte nuclear factor 1 alpha (TCF1)
2	NM_008746	18213	Nrk43	neurotrophic tyrosine kinase, receptor, type 3
2	AK020406	213054	Gabrb2	GA repeat binding protein, beta 2, p1r-A53950 - A53950 transcription factor GABP beta 2-1 chain - mouse 100.00 %
2	BC004739	213211	Rnr26	ring finger protein 26
2	NM_008736	16185	Nrl	neural retina leucine zipper gene
2	AK011405			
2	NM_013925	30947	Adp11	adenosine deaminase, tRNA-specific 1 [Mus musculus] 100 % /
2	X59289	213742	Xisf	inactive X specific transcripts, gene with no protein product
2	AK018824	71581		RIKEN cDNA 9130015A21 gene
2	AK015107	73937		RIKEN cDNA 4930406E24 gene
2	BC005613			
2	AK020339	77749		hypothetical protein FLJ12547 (38% human)
2	NM_009108	20186	Nr1n4	retinoid x receptor interacting protein rip14-1 no.6 alpha isoform
2	NM_021437			
2	NM_020508			
2	NM_019863			
2	M35603	15426	Hnrc8	homeo box C8
2	NM_018802	55925	SyB	synaptotagmin syb
2	AE000664	269846		for beta locus from bases 250554 to 501917 section 2 of 3 the
2	NM_007711	12725	Cicn3	chloride channel protein cicn3
2	BC003988	83486	Rbm5	RNA binding motif protein 5
2	AB045323	52357		T42372 probable guanylate kinase (EC 2.7.4.8) 1, membrane-associated, splice form b - mouse 44 %
2	AK010153			
2	NM_011924	26361	Avpr1b	arginine vasopressin receptor 1b avpr1b; type
2	NM_008574	17235	Masp	mitochondrial capsule setonoprotein mcsip
2	NM_011086			
2	NM_025387	66154		hypothetical protein HSPC194 [Homo sapiens] 85 %
2	AF333960	70122	Mlr3	myeloid/lymphoid or mixed lineage-leukemia translocation to 3 homolog (<i>Drosophila</i>)
2	NM_008621			
2	NM_019552	56199	Anch10	ATP-binding cassette, sub-family B (MDR/TAP), member 10
2	NM_011980	26465	Zfp146	zinc finger protein 146 zfp146
2	NM_008165	14759	Gria1	glutamate receptor ionotropic ampa1 alpha gria1
2	AK005864			
2	NM_018819			
2	NM_011041	18511	Pax9	pax9
3	NM_010587			
3	NM_019767	56443	Arpcla	actin related protein 2/3 complex, subunit 1A
3	NM_016878	13437	Dnpep	aspartyl aminopeptidase
3	AK019934	70255		pir.T14768 - T14768 hypothetical protein DKFZp566K1924.1 - human (fragment) 93.56 %
3	NM_026437			

FIGURE 20-4

cluster analysis 1
breast cancer
hypothalamus

Cluster Access	Locus	Gene	Description
3 NM_018767	26395	Map2k1	mitogen activated protein kinase kinase 1
3 NM_008927	71740	Pvrl4	adult male lung riken cDNA clone:1200017115
3 AK004821	12566	Cdk2	cyclin-dependent kinase 2 [Mus musculus] 100 %
3 NM_016756	15509	Kcne1	adult male stomach riken cDNA clone:2210415d19; k+ channel
3 NM_008424	12592	Cux4	caudal type homeo box cdx4
3 NM_007674	73344		RIKEN cDNA 1700034J05 gene
3 AK006598			T cell activation, increased late expression
3 AK017316	84544	Tactile	protein DKFp56811024.1 - human (fragment) (37% human)
3 NM_032465	67902		CHK2 checkpoint homolog (S. pombe)
3 AK005050	50883	Chek2	src-box containing 7 sox7
3 NM_016681	20580	Sox7	open reading frame 61
3 NM_011446	218157	Orf61	cdc2/cdc28-like protein kinase 4 cdk4 sv; cdc like clone mgs:7477
3 BC005494	12750	Ck4	RIKEN cDNA 2010009J04 gene
3 NM_007714	76523		poliovirus receptor-related 3 -neclin-3 alpha, neclin-3 beta, neclin-3 gamma [Mus musculus] 100 %
3 AK008163	70523		
3 AK017666	58998	Pvrl3	epithelial membrane protein 2
3 NM_021495			carboxypeptidase X 1 (M14 family)
3 AK047557	13731	Emp2	receptor tyrosine kinase 3 end putative; c-met proto-oncogene met
3 BC006075	56264	Cpim1	serine (or cysteine) proteinase inhibitor, clade B, member 4
3 AF083878	17289	Mer	hypothetical nuclear factor SBB122 [Homo sapiens] 90 %
3 NM_019696	20248	Serpina4	germ cell-specific ankyrin, SAM and basic leucine zipper domain containing protein
3 NM_008587	71793		Sp1-C transcription factor (Sp1-1PU.1 related)
3 NM_009126	74068	Gaz2	expodin 5
3 AK003874	20728	Spk	discs, large homolog 1 (Drosophila)
3 NM_023729	72322	Xpc5	sarcoglycan gamma 35kd dystrophin-associated glycoprotein sgcg
3 NM_011461			monocarboxylate transporter
3 AK012248	20501	Sic16a1	insulin receptor tyrosine kinase substrate (90% human)
3 AK004527	66698		
3 NM_007862	74989		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930465A12 product:hypothetical protein
3 NM_008634			
3 NM_011892	24053	Sgcr	organic cation/carnitine transporter octn2
3 NM_009196	71597		adult male caecum riken cDNA clone:9130012o13
3 AK004918	22121	Rpl13a	ribosomal protein l13a rpl13a
3 AK005683			
3 AK004148	15497	Hsd3b6	3-beta-hydroxysteroid dehydrogenase/delta-5-delta-4-isomerase; hydroxysteroid dehydrogenase-5 delta S-3-beta hsd3b6
3 AK015502			
3 BC018324			WD repeat domain 10
3 NM_023181	81896	Vdr10	glutamic acid decarboxylase 1
3 NM_011396	14415	Gad1	SNXJ_HUMAN Sorting nexin 19 (84% human)
3 AK018615	102607		RIKEN cDNA 2310032D16 gene
3 NM_009438	74182		POL2_MOUSE Retrovirus-related POL polyprotein [Contains: Reverse transcriptase ; Endonuclease] (32 % M.musculus)
3 AK016624	70770		preludin 2 pldn2
3 NM_013821	18637	Pldn2	rab3a member ras oncogene family
3 AK007368	19339	Rab3a	GPV_RAT Platelet glycoprotein V precursor (GPV) (CD42D) 30 %
3 NM_025933	66650		
3 AF286075			cop9 constitutive photomorphogenic subunit 7b arabidopsis cop97b
3 NM_008077			cystatin 8 (cystatin-related epididymal spermatogenic)
3 AK009218			ADP-ribosylation-like factor 6 interacting protein 5
3 BC004635			
3 AK020315			
3 AK009553			
3 AK014334			
3 AK007327			
3 NM_011070			
3 NM_009001			
3 NM_025684			
3 AK005756			
3 NM_008516			
3 NM_012004			
3 AF090631			
3 NM_022992			
3 NM_079682			
3 NM_007990			

FIGURE 20-5

cluster analysis I
breast cancer
hypothelamus

Cluster Access	Locus	Gene	Description
3 NM_011632 3 AK003792 3 NM_009802 3 AK003217 3 AK018570 3 NM_011378 3 NM_010326 3 AK018963 3 AK005924 3 NM_008951 3 NM_009996 3 NM_009297 3 NM_025327 3 BC008225 3 BC002151 3 NM_007498 3 NM_020514 3 NM_026556 3 NM_010661 3 AK018698 3 AK007258 4 NM_008026 4 AK018179 4 BC005800 4 NM_025423 4 AF121976 4 AK011866 4 NM_009112 4 NM_020574 4 NM_007780 4 AK018269 4 AK008083 4 AJ223472 4 NM_021447 4 BC003243 4 NM_011031 4 AK012882 4 NM_024277 4 NM_025449 4 AK014752 4 AK009522 4 NM_019714 4 NM_026097 4 NM_069732 4 BC005792 4 AK014178 4 NM_032400 4 AK018100 4 NM_013614 4 AF277093 4 L20343 4 NM_010200 4 AK002353 4 NM_023149 4 NM_027561 4 NM_026574 4 AK008940 4 NM_009423 4 AK011531 4 NM_013485 4 NM_023537 4 NM_020006 4 AK016515 4 AK007686	12353 Car6 20466 Sirc3a 14723 Gp1ba 71313 19185 Psmc4 13081 Cyp24 66059 11910 Ait3 16662 Krt1-12 Unknown 14247 Fil1 66206 72481 20194 S100a10 57442 Kne3 12983 Csf2b1 76877 Rab36 72041 58522 Rnt30 226442 18452 Pth2 75768 87338 11988 Avp 170789 Ple1 84112 Gpr91 18263 Odc 12296 Cacnb2 70163 16506 Kord1 12279 C9 69808 Rab3b 56699 Cdc42ep4 72018	carbonic anhydrase 6 transcriptional regulatory protein msn3 amino acid feature: paired amphipathic helix pah1 bp 499 839 ha; regulator sin3a yeast platelet glycoprotein ib-alpha membrane receptor subunit von willebrand factor receptor surface adult male testis riken cdna clone:1700012m13; clone:4833432k11 prolactin (prosome, macropain) 26S subunit, non-ATPase, 4 cytochrome p450 24 cyp24 18 days embryo riken cdna clone:1110002k21 transcription factor tlg-21 leucine zipper protein; activating 3 alt3 keratin complex acidic 12 krt1-12 adult male testis riken cdna clone:1700123m18 friend leukemia integration flt1 adult male testis riken cdna clone:4930570k09 RIKEN cDNA 2610203C22 gene calpacin i light chain p11 potassium voltage-gated channel, isk-related subfamily, gene 3; minK-related peptide 2 [Mus musculus 100 % / interleukin receptor-like protein alc2b precursor RAB36, member RAS oncogene family RIKEN cDNA 2010004B12 gene muscle-specific ring-finger protein murl hypothetical protein LOC226442 procollagen-proline 2-oxoglutarate 4-hydroxylase alpha ii polypeptide pth2 Mus musculus 0 day neonate head cDNA, RIKEN full-length enriched library, clone-4833422M21 product:hypothetical protein firing [Homo sapiens] 83 % arginine vasopressin clone mpc:11662 G protein-coupled receptor 91 ornithine decarboxylase, structural calcium channel, voltage-dependent, beta 2 subunit Similar to A43932 mucin 2 precursor, intestinal - human (fragments) 27 % potassium channel protein msal fragment for complement component c9 protein RAB3B, member RAS oncogene family CDC42 effector protein (Rho GTPase binding) 4 RIKEN cDNA 4833415N24 [Mus musculus] 60 %	

FIGURE 20-6

Cluster	Access	Locus	Gene	Description
4	AK0200719	77205		Mus musculus adult male diencephalon cDNA, RIKEN full-length enriched library, clone:9330165G04 product:hypothetical protein
4	NM_023234	64136	Sol211	stromal cell-derived factor 2-like 1 [Mus musculus] 100 %
4	AK016101	75266		S6619 Mus 20 protein - (42% human)
4	AK008069	69870		RIKEN cDNA 2010003119 gene
4	NM_016700			dishevelled 2 dsh homolog drosophila dv2
4	NM_007888	13543	Dv2	F-box only protein 15
4	AF176530	50764	Fbxo15	SWI/SNF related, actin dependent regulator of chromatin, subfamily c, member 1
4	AK006972	20588	Smarrcc1	testis-specific c-abl protein
4	AK019034	11350	Abi1	grih-gap encoding gonadotropin-releasing hormone and grh-associated peptide gap precursor
4	J02995	14714	Grh	gamma-aminobutyric acid gaba-a receptor subunit rho 2 gabra2
4	M14872	14409	Calcrl2	phosphoplate c beta3
4	NM_008076	18797	Plcb3	3-hydroxyisobutyrate dehydrogenase clone mgc:7270
4	NM_008874	70802		RIKEN cDNA 1700019F09 gene
4	AK014534	68585		hypothetical protein FLJ20125 [83% Homo sapiens]
4	BC003914			rho gdp dissociation inhibitor gdi gamma arhgdg
4	NM_020591			neutrophil cytosolic factor 2
4	NM_009582	71860		mucin 10, submandibular gland salivary mucin
4	AK006118	252876		peroxisome proliferative activated receptor, gamma, coactivator 1
4	AK015243	14570	Arhgdg	peroxin 2, peroxisomal targeting signal 1 receptor-like; RIKEN cDNA 1700016J08 gene [Mus musculus] 100 %
4	NM_008113	17970	Ncf2	kif21a kinesin-like protein
4	NM_010877			j1 protein yeast ribosomal l3 homologue
4	NM_031260	17830	Muc10	protocadherin alpha 10
4	NM_008644	19017	Ppargc1	serotonin transporter sert neurotransmitter; encoding serotin
4	NM_008904	58869	Per2	integral membrane-associated protein 1
4	NM_021483			dolichyl-dl-phosphoglycerolipid-protein glycoltransferase ddot
4	AK016435			golgi associated, gamma adaptin ear containing, ARF binding protein 2
4	NM_016705	16554	Kif21a	Mus musculus adult male hymus cDNA, RIKEN full-length enriched library, clone:5830412H02 product:hypothetical protein
4	NM_009674	27367	Rpl3	
4	NM_025465			
4	AK006410			
4	AK010364	12943	Pcdh10	
4	AB008163			
4	NM_020493			
4	NM_026096			
4	NM_010484	15567	Slc6a4	
4	NM_008411	16433	Ilmap1	
4	NM_007838	13200	Ddost	
4	AK004632	74105	Gp2	
4	NM_024263			
4	AK017922	74752		
4	AK017044			
4	NM_009871			
4	AK017598			
4	AK016452	74742		
4	NM_029092	73090		
4	AK013837	26961	Rpl8	
4	NM_012053	18114	Nrp1	
4	NM_010925			
4	NM_008191			
4	L25690			
4	AK006739			
4	NM_008980	19262	Ptpn2	
4	AK010169	69940		
4	AK013041			
4	AK006168			
4	NM_019933			
4	NM_007516	11991	Hnrnpd	
4	NM_017471			
4	NM_010700	16835	Ldlr	
4	NM_010060	13411	Dnahc11	
4	AK015948	75196		

FIGURE 20.7

cluster analysis of
breast cancer
hypothalamus

Cluster	Access	Locus	Gene	Description
4	AK006970	75719		RIKEN cDNA 1700081L11 gene
4	AK014978			
4	NM_019670	56419	Dnao3	DIA3, MOUSE Diaphanous protein homolog 3 (Diaphanous-related (armin 3) (DRF3) (mDIA2) (p134mDIA2) 100 %
4	NM_025450	66258	Mhrs17	adult male tongue riken cDNA clone:2310032109
4	AK016694			
4	NM_009623	11514	Adcy8	adenylyl cyclase type
4	BC002120			
4	NM_023233	66597	Trim13	days embryo riken cDNA clone:5730562c12
4	NM_019483	55994	Mapdh9	snad8 protein
4	NM_011467			
4	AK058864			
4	AK013454			
4	NM_011360	20392	Sgce	epsilon-sarcoglycan alternative splice product, alpha-sarcoglycan
4	NM_008871			
4	NM_013569	16511	Kcnh2	ether-a-go-go-related protein isoform merng1a merng1 potassium channel herg encoded by genbank accession number u04270 contains sequen; isoforms merng1a and merng1b
4	NM_007745	12854	Cor1	cor1a3lin
4	NM_007871	13430	Dnm2	dynammin 2
4	BC005500			
4	NM_024472	79554		putative glycolipid transfer protein (25% human)
4	AK018071			
4	AK007760			
4	AK007731			
4	NM_008094	14466	Cba	acid beta glucosidase
4	NM_023784	75581		RIKEN cDNA 2310016N21 [Mus musculus] 100 %
4	NM_009462	22224	Uchlp	ubiquitin C-terminal hydrolase related polypeptide
4	D28797	20908	Slx3	synlaxin 3a
4	NM_030706	80890	Trim2	tripartite motif protein trim2
4	NM_009819	12386	Caina2	calenin alpha 2 calina2
4	BC003973			
4	AK013903			
4	NM_019507	57765	Tbr21	transcription factor tbr21, t-box family member; homolog; t-cell-specific 1-bcl
4	NM_019582	54652	Caena11	calcium channel voltage-dependent alpha 11 subunit caena11
4	NM_025339			
4	AK017287			
4	NM_011044	18534	Pck1	phosphoenolpyruvate carboxykinase 1, cytosolic
4	AK008830	72290		Similar to 159401 protein-tyrosine kinase (M.Musc 56%)
4	NM_025459			
4	NM_028605	73692		A44492 probable DNA/RNA-binding protein - rat 55 %
4	NM_007481	11845	Arf6	ADP-ribosylation factor 6
4	AK008081	52710		DNA segment, Chr 15, ERA10 Dcl 747, expressed
4	AK010511			aquaporin
4	NM_016689			
4	NM_020503	11828	Aqp3	
4	NM_013810			
4	NM_021313			
4	AK004191			
4	BC005600			
4	NM_009213	20598	Snord2	neutral sphingomyelinase
4	AF332051	104112	Acly	ATP citrate lyase
4	AK015073			
4	NM_025384			
4	NM_025550			
4	AK004882	74150		Similar to hypothetical protein FLJ22004 [Homo sapiens] 89 %
4	NM_021793			transmembrane protein 6 clone mrgc1179a; m83
4	AK002574	60455	Tmem8	AT12, MOUSE Alpha-1-antitrypsin 1-2 precursor (Serine protease inhibitor 1-2) (Alpha-1 protease inhib 35 %
4	NM_009468	68348		
4	BC006805			
4	NM_008315	15566	Htr7	5-hydroxytryptamine (serotonin) receptor 7
4	NM_021302	57740	Pke	PKE protein kinase, hypothetical serine/threonine protein kinase [Mus musculus] 100 %
4	NM_019741	56485	Sic2a5	fructose transporter glul5
4	AK002769	71683		glycophorin C, isoform 2 [Homo sapiens] 68 %
4	AK005698			
4	AK011036	66220	Mmp28	mitochondrial ribosomal protein S28
4	NM_054097	117150	pip5k2c	phosphatidylinositol-4-phosphate 5-kinase, type II, gamma

FIGURE 20-8

Cluster	Access	Locus	Gene	Description
4	NM_026346	67331	Ftnc32	day neonate head riken cdna clone:4833442g10
4	U10162	18451	Pth91	proly 4-hydroxylase alpha-subunit
4	AK004664	73830		muscle specific gene [Homo sapiens] 98 %
4	AK015769			Mus musculus RIKEN cDNA 2700063A19 gene, mRNA (cDNA clone MGC 6632 IMAGE:3492667), complete cds
4	BC000382			Mid-1-related chloride channel
4	AK015864	229725	Moc	Kell blood group
4	BC003247	23925	Kel	protein disulfide isomerase-related erp72; calcium binding intestinal cai
4	NM_032540	12304	Cai	protein (peptidyl-prolyl cis/trans isomerase) NIMA-interacting, 4 (parvulin)
4	NM_009787			very low density lipoprotein receptor
4	NM_021430	69713	Pih4	doa2/2 delta proteasome subunit
4	AK010338	22359	Vdr	Similar to hypothetical protein FLJ20211 [80% Homo sapiens]
4	NM_013703	19175	Psm6	G7e protein
4	NM_008946	72341		adaptor-related protein complex ap-1 mu subunit clone mgc6219; cdkhrn-associated adaptor medium chain 1a ap1m1
4	AK011270			RIKEN cDNA B430319H21 gene
4	AK013485	110956	g7e	reindeer salivary gland binding protein 4
4	NM_033075	11767	Ap1m1	RIKEN cDNA 1700086C05 gene
4	NM_007456	77849		holocytochrome c synthetase hccs
4	AK021028	78654	Rbp4	Dp3 bels
4	NM_009030			RIKEN cDNA 2610020H08 gene
4	AK016881	15159	Hccs	Ibr2 t-box-containing
5	AK013425	216190	Dp3b	12 days embryo embryonic body between diaphragm region and neck riken cdna clone:9430086a13; ribosomal protein s5
5	NM_008722	72152		macrophage scavenger receptor type I; sr-a
5	BC007232	13813	Eomes	interferon response element binding factor 1
5	AB031037	20103	Ros5	translocase of inner mitochondrial membrane 8 homolog a yeast clone mgc6730; lnm6a
5	NM_009095	20288	Msr1	v-rat simian leukemia viral oncogene homolog B (ras related)
5	AF203781	26573	Ireb1	hypothetical protein FLJ21168 [76% Homo sapiens]
5	NM_013714	30058	Tirm6a	defense/immunity protein activity, indoleamine-pyrole 2,3-dioxygenase activity
5	NM_013698	64143	Rarb	
5	NM_022327	72651		
5	NM_026311	16326	Inbbe	
5	NM_008382			
5	NM_025419			
5	AK015359			
5	AK009217	69511		KLKC_HUMAN Kalikrein 12 precursor (Kalikrein-like protein 5) (KLK-L5) 70 %
5	AK014396	74020	Cpne4	copine IV
5	AK006243	66091	Ndufa3	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3
5	NM_023884	72699		riken cdna 2810038k19 2810038k19lik
5	NM_008325	15932	Idua	alpha-L-iduronidase idua
5	NM_033572			
5	AK009114			
5	NM_028181			
5	NM_008399	16407	Itipe	integrin alpha e epithelial-associated ligase
5	NM_008548	17185	Mam1a	mannosidase alpha man1a
5	NM_010174			
5	AF223953	54208	Avi6p	ADP-ribosylation-like factor 6 interacting protein
5	AK007715			
5	AK016985			
5	AK016865	71164		T47144 hypothetical protein DKFZp761E1347.1 - human (fragment) (40% human)
5	NM_018826	54352	Irv5	adult male lung riken cdna clone:1200013n09; partial roquais homeobox protein irx5
5	NM_025771	66797	Crtlna2	conactin associated protein-like 2
5	BC003954			
5	AK012616	66506		RIKEN cDNA 1810042K04 gene
5	AF320786	77590		KIA00599 gene product [92% Homo sapiens]
5	AK018146	17344	Miz1	Miz1-interacting-zinc finger
5	X95226			
5	AK012661			
5	NM_020330	56622	Adam21	AD21_MOUSE ADAM 21 precursor (A disintegrin and metalloproteinase domain 21) (ADAM 31) 100 %
5	NM_021555	59053	Brip16	brain protein 16; DNA segment, Chr 15, ERATO Doc 741, expressed [Mus musculus] 100 %
5	NM_008050	26423	Nr5a1	nuclear receptor subfamily group a member nr5a1
5	AK009120			
5	AF169817	226971	Plekhd2	pleckstrin homology domain containing, family B (evectins) member 2
5	NM_013926	17434	Moc52	myoiodenum cofactor synthetase 2 [Mus musculus] 100 %
5	AK002327			

FIGURE 20-9

Cluster	Access	Locus	Gene	Description
5	BC018210	67017		chromosome 20 open reading frame 108 [Homo sapiens] 77 %
5	AK011064	70235		DKFZP434C245 protein [Homo sapiens] 90 %
5	AK015544	75810		RIKEN cDNA 4930471A21 gene
5	NM_008938	18133 Rds		retinal degeneration, slow (retinitis pigmentosa 7)
5	NM_007803	13043 Ctn		coractin ctn
5	NM_010121	13665 Efr2ak3		eukaryotic translation initiation factor 2 alpha kinase 3
5	AK017101	71245		SJ10151 transforming protein tm - (34% mouse (strain balb/c))
5	NM_008936	19127 Prop1		paired like homeodomain factor 1
5	AK010320			
5	AK005423	75507 Abp1		aminolide binding protein 1 (amine oxidase, copper-containing)
5	NM_020290	56860 Orl1b		odorant receptor S18 gene
5	NM_030556			
5	AK020727			
5	NM_019789	56315 Rhoq		rh type c glycoprotein rhoq
5	NM_022656			
5	NM_031255	83434 Rsh1		radial spokehead-1 protein rsh1
5	AK005168			
5	AK007452			
5	AK012674			
5	AK031814			
5	AK019873			
5	AK009812			
5	AK005205			
5	NM_011979	26464 Vmn3		vanin 3
5	NM_008556	18611 Pex15		phosphoprotein enriched in astrocytes 15
5	AK020544	77363		RIKEN cDNA 953004P13 gene
5	NM_011444	20678 Sox5		sox-box containing 5 sox5
5	NM_009123	20231 Nix1-2		NK1 transcription factor related, locus 2 (Drosophila)
5	NM_008707	18107 Nmt1		N-myristoyltransferase 1
5	NM_053266			
5	AK016041			
5	NM_025591	66488		RIKEN cDNA 2010309E21 gene
5	NM_010285	14601 Ghrh		growth hormone releasing
5	NM_008402	16410 Ilgav		cd1 integrin alpha v subunit vitronectin receptor
5	NM_009858	12528 Cd8b		CD8 antigen, beta chain
5	NM_010770	17182 Mairn3		matrilin 3
5	NM_011949			
5	AK009853	76968		RIKEN cDNA 2310046K23 gene
5	AK011256	67896 Ssg1		steroid sensitive gene 1
5	NM_020605	57340 Jph3		junctional protein 3; junctional type 3 [Mus musculus] 100 %
5	AB047323			Mus musculus gene for Cox17p, complete cds
5	NM_007809	13074 Cyp17a1		cytochrome P450, family 17, subfamily a, polypeptide 1
5	NM_013907			
5	AF193437	20669 Sox14		SRY-box containing gene 14
5	NM_016871	53333 Torrm40		translocase of outer mitochondrial membrane 40 homolog (yeast)
5	NM_009575	22773 Zlc3		zlc3 protein
5	AF343088			
5	AK014837			
6	NM_009798	12345 Capbb1		capping protein actin filament muscle z-line beta clone mpc:6082
6	NM_016812	229615 Pex33		protein inhibitor of activated STAT 3
6	NM_011976	26456 Semo4g		sema domain, immunoglobulin domain (lg), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4G
6	AK004582	71718		T12S14 hypothetical protein DKFZP434A073.1 - human 74 %
6	AK014939	70885		hypothetical protein FLJ10569 (100% human)
6	NM_008254	15356 Hmgcl		hmgcl 3-hydroxy-3-methylglutaryl coenzyme a lyase ht, 3-hydroxy-3-methylglutaryl-coa hmg coa
6	NM_008169	14810 Grn1		glutamate receptor channel subunit zeta-1
6	AK017869			
6	AK009882			
6	NM_020500	Unknown		clone orl-7m13 olfactory receptor orthologous to orl-72
6	AB040819	170458		RAS-related C3 botulinum substrates 3
6	BC004674			
6	NM_015826	50796 Dmrt1		doublesex and mab-3 related transcription factor dmrt1 candidate sexual regulatory protein; transcript
6	NM_016853	20840 Slac		src homology three (SH3) and cysteine rich domain (Slac)
6	AF359382			
6	NM_010155	13675 Erl		esl2 repressor factor erl

FIGURE 20-10

cluster analysis I
breast cancer
hypothalamus

Cluster	Access	Locus	Gene	Description
6	NM_025379	66142	Cox7b	riken cdna 1110004107 1110004107/rik
6	IC005635	69653		RIKEN cDNA 2310069104 gene
6	NM_008672			
6	AK016974	71248		T46637 transcription factor 1, neural - rat 41 %
6	AK011615	71517		esophageal cancer associated protein [Homo sapiens] 92 %
6	NM_016855			
6	AK015439	74658		RIKEN cDNA 4930451E06 gene
6	NM_029583	76371		10 11 days embryo riken cdna clone:2810408b13
6	NM_033560			
6	AK013166	67607		Similar to 148568 zinc finger protein 51 - mouse 43 %
6	NM_025834	66901	Pro2	protein Z, vitamin K-dependent plasma glycoprotein
6	AK008575			lar encoding protein tyrosine phosphatase; plprt
8	AF300943	19268	Plprt	
6	NM_019746			wolfram syndrome homolog wfs 1; transmembrane protein
6	NM_011716	22393	Wfs1	
6	D29587			
6	NM_007841			aminoacylase 1
6	NM_025371	109652	Acyl1	
6	AK017419			
6	NM_018788			
6	AK019493	75735	Pank1	pancreatic kinase 1
6	NM_008533	17079	Ly78	lymphocyte antigen 78 ly78
6	AK003099			
6	AK014326	70771	Scrb3	SREB3
6	NM_015768	50501	Prok2	secretory protein bvb6
6	AK018640			
6	AK016972	71198		RIKEN cDNA 4933428L19 gene
6	AK016341	71242		RIKEN cDNA 5133400G04 gene
6	NM_007670	12579	Cdkn2b	cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)
6	AK006831			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700058G18 product:hypothetical protein
6	NM_008576	22774	Zic4	cerebellum zic4 protein
6	X98456			M. musculus ORF 1 and ORF 2 genes
6	AB033615	224860	Pic12	phospholipase C-like 2
6	NM_020288	56858	Ors1	odorant receptor S1 gene [Mus musculus] 100 %
6	NM_007430	11614	Nf0b1	nuclear receptor subfamily 0, group B, member 1
6	NM_011901	24074	Taf7	TAF7 RNA polymerase II, TATA box binding protein (TBP)-associated factor
6	AK017550			
6	NM_008844			
6	NM_008069	14400	Gabrb1	gamma-aminobutyric acid (GABA-A) receptor, subunit beta 1
6	NM_008237	15207	Hes3	hes-3 helix-loop-helix transcription factor
6	NM_033268	11472	Actn2	18 days embryo riken cdna clone:1110008I24; alpha-actinin
6	NM_015819			
6	AK007800			proyl endopeptidase prep
6	NM_011156	19072	Prep	
6	NM_026593			PAL-1 mRNA-binding protein
6	NM_025814	66870	Poirbp1	
6	NM_008743			
6	M15413			
6	NM_029716			
6	NM_013636	19047	Ptp1cc	protein phosphatase 1, catalytic subunit, gamma isoform
6	AK014261	73234		RIKEN cDNA 3110078015 gene
6	U69136	12565	Cdh9	Cadherin
6	NM_010276			
6	BC005502	106947	Sic35a3	solute carrier family 39 (zinc transporter), member 3
6	AK005634			
7	NM_011750	22668	Zfp162	zinc finger protein 162
7	NM_019870	56292	Ac01	N-acetyltransferase ARD1 homolog (S. cerevisiae)
7	AK015158	74855		Similar to intersectin 2 [76% Homo sapiens]
7	NM_010077	13489	Orzd2	dopamine receptor 2
7	AK016893	71166		RIKEN cDNA 4933424G06 gene
7	BC003808			similar to hypothetical protein [Mus musculus]
7	AY013757	12943	Pcdha10	protocadherin alpha 10 - ref NP_031782.1 - protocadherin alpha 4; cadherin-related neuronal receptor 1 [Mus musculus] 81 %
7	NM_024169	66120	Fkbp11	FK506 binding protein 11
7	NM_011499			

FIGURE 20-11

cluster analysis I
breast cancer
hypothalamus

Cluster	Access	Locus	Gene	Description
7	NM_011894	24056	SH3bp5	SH3-domain binding protein 5 (BTK-associated)
7	NM_009397	21929	Tnfrsf3	tumor necrosis factor alpha-induced protein 3
7	NM_008663	18002	Nedd8	neural precursor cell expressed developmentally down-regulated nedd8
7	NM_019928	56640	Klk4	kallikrein 4 (protease, enamel matrix, prostate)
7	NM_008174	14823	Gprc1h	g protein coupled receptor family c group member h gprc1h
7	NM_009344	76948		RIKEN cDNA 2310014L17 gene
7	NM_009897	12716	Ckmt1	creatine kinase, mitochondrial 1, ubiquitous
7	NM_009265	20754	Sarr1b	18 days embryo riken cDNA clone:1110004e08
7	NM_025594	66492		RIKEN cDNA 2610510D14 gene
7	AK020902	110417	Pigh	phosphatidylinositol glycan, class H
7	AK005863			ornithine decarboxylase antizyme 2
7	NM_010952	18247	Oaz2	RIKEN cDNA 1700018F24 gene
7	NM_027069	69396		RIKEN cDNA 1700008A04 gene
7	AK005748	69351		
7	AK007432			RIKEN cDNA 2700097O09 gene
7	AK012621	72658		Similar to HCDI protein [84.44% Homo sapiens]
7	AK009339	219094		zinc finger protein 1
7	X16493	32640	Zfp1	Similar to CDC16 protein - human 79%
7	AB029537			
7	AK012511	72610		N-methylpurine-DNA glycosylase
7	AK014265			olfactory receptor mor17-1
7	NM_010022	17477	Mpg	
7	AF133300	209102	mor17-1	
7	AK003339			10 days neonate skin riken cDNA clone:4733401i23
7	AK014638			glycoprotein-associated amino acid transporter y-lactia linked by disulfide bridge to 412hcd098; y-lactib
7	NM_011405	20540	Sic7a7	zinc finger protein multitype zipm1
7	NM_009569	22761	Sic7p1	A42286 ERD-2-like protein, EL P-1 (98% human)
7	NM_025041	66913		a disintegrin and metalloproteinase domain 19 (metlin beta)
7	NM_009616	11492	Adam19	latent transforming growth factor beta binding protein 3
7	NM_008520	16980	Ubp3	growth factor receptor bound protein 7 clone mgc:5653; epidermal receptor-binding gnb7
7	NM_010346	14786	Gib7	protein phosphatase 19 formerly 2c magnesium-dependent gamma isoform clone mgc:5668
7	NM_008014	14208	Pmp19	serine/threonine kinase FKSG81(44% human)
7	NM_013915	71099		Nyd-sp12 protein
7	AK006144			RIKEN cDNA 1700026D08 gene
7	AK015690	70862	Nyd-sp12	phosphorilesterase related
7	AK006375	75556		contactin associated protein 4
7	NM_008961	19212	Pter	kanadaplin
7	AF333770	170571	Crlnap4	RIKEN cDNA 6330575P11 gene
7	AF035526	20534	Sic4a1ap	hypothetical protein FLJ13782 (94% human)
7	BC004776	233802		anaphase-promoting complex subunit 7
7	BC004783	252973	Gln2	copine III
7	AJ278123			cathepsin d exon
7	NM_019805	56317	Apc7	mesoderm posterior 2 mcsd2
7	AK017337	70568	Cpnc3	
7	BC004728	13033	Cldc	N2,N2-dimethylguanosine (RNA methyltransferase-like [Homo sapiens] 89 %
7	NM_009983	17293	Mesd2	RIKEN cDNA 4921508M14 gene
7	NM_008589			SYO2_HUMAN Guaninyl-IRNA synthetase (Guanine-IRNA ligase) (GLNRS) 90.06 %
7	NM_021456	98685		n-acetylglucosaminyltransferase iii mgal3 glycosyltransferase intracellular coding region; mannoside acetyl glucosaminyltransferase 3
7	AK004493	70844		HINT_MOUSE Histidine rich nucleotide-binding protein [Protein kinase C inhibitor 1] (Protein kinase 60 %
7	AK014845	97541		small inducible cytokine subfamily cys-x-cys member 9 clone mgc:6175; b scy69
7	NM_010795	17309	Mgal3	
7	AK004497	68917		Similar to KUP protein - human 89%
7	NM_008599	17329	Scy69	RIKEN cDNA 4933411K20 gene
7	BC004761			A38346 ultra-high-sulfur keratin 1 - mouse 32 %
7	BC003284			meiotic cohesion Rec8
7	AK013374	72788		c-type lectin dcl1 type II transmembrane protein
7	NM_025747	66756		RIKEN cDNA 1600012K10 gene
7	AK006205	71848		
7	NM_020002	56739	Rec8	
7	NM_019791			
7	NM_020257	93675	Dcl1	
7	AK005431	67009		
7	AK010399			

FIGURE 20-12

Cluster	Access	Locus	Gene	Description
7	NM_010254	14428	Gatf2	gating receptor 2
7	AF156450	14405	Gabrg1	gamma-aminobutyric acid (GABA-A) receptor, subunit gamma 1
7	BC002226	170833	Hook2	hook homolog 2 (Drosophila)
7	NM_008151	14738	Gpcr12	G-protein coupled receptor 12
7	NM_009705	11847	Arg2	arginase type II
7	AK017601	68021		A56716 aromatic ester hydrolase (EC 3.1.1.-) - human 85 %
7	NM_007567	79235	Ctcf	lecithin:retinol acyltransferase (phosphatidylcholine:retinol-O-acyltransferase)
7	NM_023624	7	AJ011106	chloride channel 1
7	AK018573	12723	Ctcf1	
7	NM_009861	12540	Cdc42	cell division cycle 42 homolog (S. cerevisiae)
7	MY1753	17683	Myh3	myosin heavy chain 3 (tank)
7	NM_011294	20024	Rpo2tc1	rna polymerase II transcriptional coactivator rpo2tc1
7	AK007245	68107		RIKEN cDNA 1700051C08 gene
7	AK015324	73975		RIKEN cDNA 4930435H24 gene
7	AK006407	76420		RIKEN cDNA 1700027A23 gene
7	AK015017			NK6 transcription factor related, locus 2
7	L08074	14912	Nhx6-2	
8	AK007696			RIKEN cDNA 5830412B09 [Mus musculus]
8	NM_026670	68310		nsp-like 1 protein nsp1b (unc-sec and fosb; aa 1-338)
8	NM_008036	14282	Fosb	
8	NM_008163			olfactory receptor 49 olfr49
8	AK012922	18348	Olfr49	
8	NM_010591			limb deformity form
8	NM_019460			(f3)lilf (lilf) factor 3 (intestinal protein exons 1-3)
8	BC005492			GTPase regulator associated with the focal adhesion kinase pp125 [Homo sapiens] 56.19 %
8	BC004626	14260	Fmn	Similar to MOUSE Alpha-actinin 3 (Alpha actinin skeletal muscle isoform 3) (F-actin cross linking protein) 28 %
8	NM_010230	21786	Tif3	soluble carrier family 30 zinc transporter member slc30a3; znt-3
8	NM_011575	71544		glycoprotein ib gp1balpha iib-iiig2b allele platelet fibrinogen receptor
8	AK018520			
8	NM_013891	75356		
8	AK016205			
8	NM_011246			
8	NM_011773	22784	Slc30a3	
8	NM_010575	16399	Iiga2b	
8	NM_011352			
8	NM_028232			
8	AK016577			
8	NM_011615			
8	NM_023697	18091	Nhx2-5	
8	NM_008700	11832	Aqp7	
8	NM_007473			
8	NM_010125			
8	NM_080557	69150	Snx4	sorting nexin 4 [Mus musculus] 100 %
8	NM_013900	30660	Mhr2	antigen p97 (melanoma associated) identified by monoclonal antibodies 133.2 and 96.5
8	NM_017475	54170	Ghr2	small GTPase, homolog (S. cerevisiae)
8	AK016428	67120		RIKEN cDNA 2700016E08 gene
8	AK006568	73332		MYH3_RAT Myosin heavy chain, fast skeletal muscle, embryonic (22% M.musculus)
8	NM_009502	22330	Vcl	vinculin
8	NM_016857			
8	NM_011503	20811	Slx1p2	
8	AK014327	244672		synlaxin binding protein 2
8	AK009646	71900		RIKEN cDNA 3230401103 gene
8	NM_008954	19197	Pgen	persephin
8	NM_016858	19336	Rab33b	rab33b member of ras oncogene family
8	NM_031494			recombining binding protein suppressor of hairless-like (Drosophila)
8	NM_009036	18668	Rbpsuh1	
8	AK006786			
8	NM_009789			
8	NM_026586			
8	NM_009788			
8	AK005032	71779		hypothetical protein FLJ20668 [Homo sapiens] 83.50 %
8	NM_023320			
8	AF242376	104349	Zfp119	zinc finger protein 119 - gonadotropin inducible

FIGURE 20-13

Cluster Access	Locus	Gene	Description
8 AK010371	14387	Gaa	lysosomal alpha-glucosidase
8 NM_008054	24063	Spry1	sprouty homolog 1 (Drosophila)
8 NM_011896	66329		Similar to type I transmembrane receptor (seizure-related protein) [37% Homo sapiens]
8 AK013276	21854	Tnni17a	adult male heart riken cdna clone:1010001113
8 BC010830	50535	Solt7l	stylyltransferase 7 ((alpha-N-acetylneuraminy 2,3-beta-galactosyl-1,3)-N-acetyl galactosaminide alpha-2,6-sialyltransferase) F
8 NM_016973	67458		hypothetical 43.2 Kd protein [45% Homo sapiens]
8 NM_026170			
8 NM_023622			
8 AK014533	21898	Tti4	tol1-like receptor 4
8 NM_019720	56368	Tsp10	tumor suppressor region 10
8 AK016159	75308		RIKEN cDNA 4930557B2.1 gene
8 NM_018815	54563	Nup210	nuclear pore membrane glycoprotein 210 pom2 10
8 BC018220			
8 NM_010633	17688	Msn	moesin
8 NM_019961	56535	Pex3	peroxisomal biogenesis factor 3
8 NM_007904	13618	Ednrb	endothelin-b receptor ednrb
8 NM_009257	20724	Serpinsb5	serpine or cysteine proteinase inhibitor clade ovalbumin member clone mpc:5950; tumor suppressor maspin
8 AD041650	230991		brain cdna clone mmb-3968 unnamed protein product
8 NM_025425	66211	Rpl3l	ribosomal protein L3-like
8 NM_011519	20969	Sdc1	syndecan 1
8 NM_011779	23790	Cerolc	ceronin-3
8 NM_010301			
8 NM_008896			
8 NM_010309	14683	Gnps	GNAS (guanine nucleotide binding protein, alpha stimulating) complex locus
8 NM_020558	57316	C1d	small unique nuclear receptor co-repressor sun-or corepressor for hormone receptors c1d; dna-binding protein c1d
8 NM_033618			
8 NM_007457	11769	Ap1s1	calthrin-associated protein 19 ap19
8 AK017508			
8 BC011417	74776		inorganic pyrophosphatase [Homo sapiens] 71 %
8 AK005862			
8 AJ288061			intranuclear protein
8 NM_008383	16328	Imp	
8 AK016926			
8 AK016419			
8 BC017532			
8 NM_026395	67830		similar to S. cerevisiae RER1 [Homo sapiens] 96 %
8 NM_009458			
8 NM_009749			
8 AK004956	71758		T00335 hypothetical protein KIAA0564 - human (fragment)(89% human)
8 NM_020279	56838	Scya28	small inducible cytokine a28 scya28
8 NM_031873	83770	Tas1t2	candidate taste receptor 11/2 g protein coupled
8 NM_021359	16420	Iigp6	integrin beta-6 subunit integral membrane protein
8 NM_013773			
8 AF408435	233406		protein regulator of cytokinesis 1-like
8 AK008072	68861		adult male small intestine riken cdna clone:2010003x11
8 DS3902	22860	Trim25	estrogen-responsive finger protein; clone mgc:6886
8 NM_026434	67889		RIKEN cDNA 2010004P11 gene
8 NM_009493	22310	V2r4	vomerionasal 2, receptor, 4
8 NM_011251	19654	Rbm6	RNA binding motif protein 6
8 NM_009885	12613	Cel	carboxyl ester lipase
8 NM_008074	14407	Gabrg3	gamma subunit of the gaba-alpha receptor
8 NM_025705			
8 NM_009498	22319	Vamp3	vesicle-associated membrane protein cellubrevin vamp/synaptobrevin homolog
8 AK014780	73763		RIKEN cDNA 4833427C08 gene
8 AJ245854	13822	Epb4 1t2	erythrocyte protein band 4.1-like 2
8 X63932	20190	Ryr1	brain ryanodine receptor type
8 NM_025396	66171	P0f5	6-phosphogluconolactonase
8 AK009528			
8 NM_003385	21869	Tifrl	thyroid transcription factor 1
8 NM_028279	72560	Naalad2	N-acetylated alpha-linked acidic dipeptidase 2
8 AK007531	69166		pancreatic lipase [Homo sapiens] 55 %
8 BC003865			
8 NM_019956	56735	K12-6g	keratin complex 2, gene 6g [Mus musculus] 100 %
8 NM_011359	20389	Slip	surfactant associated protein C

FIGURE 20-14

Cluster Access	Locus	Gene	Description
8 NM_024203	67344		RIKEN cDNA 4932442K08 [Mus musculus] 100 %
8 AK009293	69602		RIKEN cDNA 2310011E08 gene
8 NM_013622	18366	Oprd1	opioid receptor, delta 1
8 NM_023635	11891	Rab27a	Rab27a member ras oncogene family clone mgc:11677; es cells riken cDNA clone:2410003m20
8 AK005616	75435		adult male testis riken cDNA clone:1700001o02
8 AF140708			
8 NM_008133			
8 AK002836			
8 AK016037	75212		adult male testis riken cDNA clone:4930544i10
8 NM_016798	53318	Pdim3	PDZ and LIM domain 3
8 U12147	16773	Lama2	laminin-2 alpha2 chain m-chain merosin chain m-chain
8 NM_025980			
8 NM_021547	59045	Mir64	steroidogenic acute regulatory protein related clone mgc:5956
8 NM_010164			
8 NM_008918	19064	Ppy	pancreatic polypeptide
9 AK008060	72058		RIKEN cDNA 2010003D20 gene
9 NM_011514	20937	Suv39h1	suppressor of variegation 3-9 homolog 1 (Drosophila)
9 AK005693	71831		RIKEN cDNA 1700007B14 gene
9 AK011208	72135		RIKEN cDNA 2600014C22 gene
9 NM_010061	13419	Dnase1	deoxyribonuclease 1
9 AF013969			
9 AK013193	74199	Vil	villin
9 AK004398	68865		likely ortholog of yeast ARV1 [Homo sapiens] 80 %
9 BC004098			
9 NM_008766	18399	Skc22a6	organic cationic transporter-like orct11
9 BC005669	97423		expressed sequence R74862
9 NM_032396	84035	Kremen	kremen kring-like-containing transmembrane protein
9 X76011			
9 AF045766	14762	Gpr33	orphan G protein-coupled receptor gpr33 related to chemotactant receptors
9 U18746	14179	Fgfr6	fibroblast growth factor 6
9 AK015693	75823		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930525F21 product:hypothetical protein
9 AB044335	75870	Tcam1	testicular cell adhesion molecule 1
9 AK005379	76497	Pap1r11	protein phosphatase 1, regulatory (inhibitor) subunit 11
9 AK017913			
9 NM_026656	68279		musculin 2 - RIKEN cDNA 3300002C04 [Mus musculus] 100 %
9 AK005818			
9 AJ289241	17201	Mc3r	melanocortin receptor
9 AK016259	60054	Capn12	calpain 12
9 AK009779	69671		RIKEN cDNA 2310043J08 gene
9 AF302691	170676	Peg10	paternally expressed 10
9 AK014919	66336		Similar to CAMP171% Mus musculus
9 AK009420	66381		Z183_HUMAN Zinc finger protein 183 92 %
9 NM_019953	56530	Tmem4	transmembrane protein 4
9 NM_008308	15550	Htr1a	5-hydroxytryptamine serotonin receptor 1a htr1a
9 NM_016753	17035	Lxn	lalestin lxn
9 NM_023219			
9 NM_019985	56760	Clec2	10 day old male pancreas riken cDNA clone:1810061i13; c-type lectin-like receptor 2 clec2
9 NM_009442			
9 AK018191			
9 AK007241	76651		adult male testis riken cDNA clone:1700122o11
9 NM_021888			
9 NM_019691	14802	Gria4	glutamate receptor ionotropic ampa4 alpha 4 gria4
9 AF316825	66695	Aspn	asporin precursor aspn preproprotein type 1 extracellular matrix leucine-rich repeat protein
9 X13538	15401	Hoxa4	hox-1.4 protein
9 AB041588	76454		T17239 hypothetical protein DKFZP434B027.1 - human (fragment) 85 %
9 AK018316			
9 AK010877	76582		Similar to Ran binding protein 11 (PO11) [95% Homo sapiens]
9 AK017134	74470	Birc4	RIKEN cDNA 4933440J22 gene
9 NM_009688	11799	Birc4	lap homolog a mita apoptosis inhibitor of baculovirus protein; baculoviral repeat-containing 4 birc4
9 NM_009751	12057	Blispl	beaded filament structural protein in lens-CP34
9 NM_033602	93834	Pel2	pellino 2
9 NM_011377	20465	Sim2	single-minded 2
9 BC003331			

FIGURE 20-15

Cluster Access	Locus	Gene	Description
9 NM_010504	15967	lna4	interferon alpha family, gene 4
9 NM_009964	12955	Cryab	crystallin alphaB
9 RC004709	107029	Me2	malic enzyme 2, NAD(+)-dependent, mitochondrial
9 AK009119	69473		keratin associated protein 3.1 [87% Homo sapiens]
9 AK010262	71955		Y174_HUMAN Hypothetical protein KIAA0174 95 %
9 AK017384			
9 NM_008236	15206	Hes2	Hes2
9 NM_020604	57339	Jph1	junctophilin 1
9 NM_023689			
9 NM_026835	68774	Ms4a6d	membrane-spanning 4-domains, subfamily A, member 6D, MS4A6D protein [Mus musculus] 100 %
9 AK020183			
9 AK015645			
9 AF119384	170717		CAMP [Mus musculus] 100 %
9 NM_013519	14234	Foxc2	mesenchyme fork head-1 protein, mfh-1
9 AY013759			
9 NM_011342	20333	Sec22l1	SEC22 vesicle trafficking protein-like 1 (S. cerevisiae)
9 NM_009354	21752	Tert	telomerase reverse transcriptase mient; catalytic subunit
9 NM_010601	16512	Kcnh3	potassium voltage-gated channel subfamily h eag-related member 3 kcnh3
9 AK016649			
9 NM_030676	26424	Nr5a2	nuclear receptor subfamily 5 group 8 member 2 nr5a2
10 AK008590	72090		Similar to ENP1_HUMAN Ectonucleoside triphosphate diphosphohydrolase 1 (NTPDase1) [Ecto-ATP diphosphohydrolase] 44 %
10 AK015021	70954		adult male testis riken cdna clone:492502b01
10 NM_008088			
10 NM_024449			
10 NM_018805			
10 NM_033327			
10 AK012275			
10 AK017820			
10 AK019881			
10 NM_010345	54710	Hs3sl3b	d-glycosaminyl 3-o-sulfotransferase-3b 3-ost-3b
10 BC004639			
10 NM_009104	14783	Grb10	potassium channel, subfamily V, member 1
10 NM_019718			
10 BC003957			
10 NM_008867			
10 NM_009252			
10 AF332067			
10 AK011591	76964		RIKEN cDNA 2610028K24 gene
10 AK35732	20941	Svp2	A40059 seminal vesicle secretory protein IV precursor - mouse (fragment) 100 %
10 NM_021325			
10 AK007097	57781	Mox2r	antigen identified by monoclonal antibody MRC OX-2 recepto
10 NM_028595			
10 NM_009215	73656	Ms4a6c	membrane-spanning 4-domains, subfamily A, member 6C
10 NM_010788	20604	Srsf1	preproscavosialin
10 AK004676	17257	Mecp2	methyl cpg binding protein 2
10 NM_021894	67459		Similar to nuclear VCP-like: Nuclear valosin-containing protein-like [Homo sapiens] 87 %
10 NM_008197	80594	Capn12	calpain 12
10 NM_008197	14958	H110	h1 histone family member clone mgc-6248; h1f0
10 NM_025633	66559	Meip1l	methionine aminopeptidase-like 1
10 NM_019650	56494	Gosr2	sec22 vesicle trafficking protein-like s. cerevisiae clone mgc-6437; golgi snare gsc27
10 AK004775	74121		acyl-Coenzyme A oxidase 3, pristanoyl; pristanoyl-CoA oxidase [Mus musculus] 31 %
10 NM_009289			
10 AK017676			
10 AK010062			
10 AK010908	72318	Pscd4	pleckstrin homology, Sec7 and coiled-coil domains 4
10 NM_009290	20990	Vmi18a	winged-related MMTV integration site 8A
10 L31395	13429	Dnm	dynamitin
10 NM_007597	12330	Cark	calnexin
10 AK017375	27081	Zfp275	Zinc finger protein 275
10 AK018074			
10 AK002481	74090		putative protein [28% Arabidopsis thaliana]
10 AK019700	67712	Mscp	mitochondrial solute carrier protein
10 NM_009031	19648	Rbbp7	retinoblastoma binding protein clone mgc-5013
10 NM_026539	68058	Chd11	riken cdna 4432404a22 4432404a22rik

FIGURE 20-16

Cluster Access	Locus	Gene	Description
10 NM_011775	27787 Zp2		zona pellucida sperm-binding protein xp2clones psp2.234 xp2 precursor
10 AK009460			transforming growth factor, beta induced
10 NM_009369	21810 Tgfb		cell differentiation and embryonic development
10 NM_021280	12547 Cted		
10 NM_026320			
10 NM_023547			
10 AK005036			
10 NM_020582	57423 Atf52		ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit I, isoform 2
10 AK012394	114896 Atp31f		ATF3(ATPase family gene 3)-like 1 (yeast)
10 AF375046			
10 NM_013470			
10 AK008922	67112 Fgf22		fibroblast growth factor 22
10 AF285178	16351 Ibp		actin-binding protein mpp
10 NM_009440			
10 M63850			
10 NM_020278	56839 Lgi1		leucine-rich repeat LGI family member 1
10 AK002441	56039		hypothetical protein FLJ13263(71% human)
10 BC008093	13634 Egr2		early growth response 2 clone mgc:7113; zinc finger protein krox-20 exon a
10 NM_011325	20277 Scrn1b		epithelial sodium channel beta subunit
10 NM_027334	70152		DKFZP586A0522 protein [Homo sapiens] 83 % / 166 aa
10 AK021227			
10 NM_021710	11782 Ap4s1		adult male cerebellum niken cdna clone:1500018b17
10 NM_008696	28921 Map4k4		mitogen-activated protein kinase kinase kinase 4
10 AK009391			
10 NM_025701			
10 AK003234			
10 NM_007400	11489 Adam12		a disintegrin and metalloproteinase domain 12 meltrin alpha adam12
10 NM_008170	14811 Grn2b		guanine receptor ionotropic mda2a epsilon grn2a
10 NM_007467	11803 Atp1a1		atp1a1 beta 34 precursor-like protein app1
10 AK005939			
10 AK012385	14422 Galg12		udp-n-acetyl-alpha-d-galactosamine:n-acetylneuraminy-galactosyl- n-acetylglucosaminylpolypeptide-beta-1 4-n-acetylgalactosaminyltransferase galg12
10 NM_008081			
10 AF105906			
10 NM_008233			
10 NM_020273	56809 Gmeb1		glucocorticoid modulatory element binding protein 1 [Mus musculus] 100 %
10 NM_018790	11838 Arc		growth factor arc
10 NM_007432	11648 Akp3		alkaline phosphatase intestinal not nm requiring akp3
10 AK007993	67490		unknown
10 AF317552	108062 Csh2		cleavage stimulation factor, 3 pre-RNA subunit 2
10 NM_008176	14825 Grl1		grl1 oncogene
10 AK019788			
10 AK017076			
10 NM_007775	12966 Cryc		gamma c-crystallin; gamma-c-crystallin
10 NM_008258	15374 Hsl		hematological and neurological expressed sequence 1
10 NM_026177	67467		RIKEN cDNA 1200011f18 gene
10 NM_007480	11844 Arf5		adp-ribosylation factor 5 arf5
10 NM_007411			
10 AK003811			
10 NM_007663	12556 Cdh16		cadp-cadherin cdh16
10 AK004506	68942		T12468 hypothetical protein DKFZp564O123.1 - human 97 %
10 NM_009979	13013 Cst9		cystatin 9
10 NM_019453			
10 NM_018736	17535 Mre11a		meiotic recombination 11 homolog A (S. cerevisiae)
10 NM_007971	14058 Ezh2		enhancer of zeste homolog 2 (Drosophila)
10 BC011211			
10 AJ011080	280662 Altn		altnin
10 AK018837			
10 NM_015770	50518 a		nonagauli
10 AJ290944	83677 Usmg2		up-regulated during skeletal muscle growth 2
10 L09600	18022 Nle2		nuclear factor, erythroid derived 2
10 AK005047	52575		hypothetical protein FLJ20432 [Homo sapiens]
10 NM_017389	53877 Ear4		eosinophil-associated ribonuclease 4
10 NM_033569	94219 Cnm2		cyclin M2
10 AK002828	67675		divalent cation tolerant protein CUTA [Homo sapiens] 91 %

FIGURE 20-17

Cluster Access	Locus	Gene	Description
10 AK017416	67088	Tp120b	TBP-interacting protein b
10 AK011495	70361	Lnmn1	lectin, mannose-binding, 1
10 NM_009415	16469	Jra	jerky
10 AK015854	67587		CDK8_HUMAN Cell division protein kinase 8 (Protein kinase K35) 90 %
11 NM_075380	11 NM_075380		male germ cell-associated kinase
11 NM_008547	17152	Mak	cell division cycle 25 homolog c.s. Cerevisiae
11 AB049821	12532	Cdc25c	arfenin
11 NM_009860	11876	Atin	
11 NM_020494	54130	Acr1a	arp1 actin-related protein yeast homolog a centration alpha clone mgc:5816; es cells riken cdna clone:2410038j03
11 AK017655	11546	Adprt2	adp-ribosyltransferase nad+ poly adp-ribose polymerase adprt2; 2 parp2 parp-1-like protein parp-2
11 NM_009632			
11 NM_026593			
11 AK012848			
11 NM_025331			
11 AK010807	69260	Ing1l	inhibitor of growth family, member 1-like - p33ING2 protein [Mus musculus] 100 %
11 NM_023503	75805		neurolysin; neurotensin endopeptidase [90.33% Homo sapiens]
11 BC016224	71373		mesenchymal stem cell protein DSC-54 [92.03% Homo sapiens]
11 AK017282	73953		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930448A20 product:undeclassifiable
11 AK015411			
11 NM_025826			
11 AK015825	67035		DJBA_MOUSE DnaJ homolog subfamily B member 4 100 %
11 AK006537	13714	Elk4	elk4 member of ets oncogene family clone image:3589378
11 NM_007923	65945	Csln1	calyculin-1 protein
11 NM_023051	60315	Myg1	melanocyte proliferating gene 1
11 AK017955			
11 AF145716	13605	Ecd2	ecd2 oncogene
11 NM_007900	15001	H2-0a	histocompatibility 2, O region alpha locus
11 NM_008206	12823	Col19a1	adult male testis riken cdna clone:4931426b13 full insert sequence; collagen a1 xiv chain
11 NM_007733	72083		es cells riken cdna clone:2410018p20
11 AK010544	209102	mor17-1	olfactory receptor mor17-1
11 AF133300	23888	Gpc6	glypican 6 gpc6
11 NM_011821			
11 AK005311	14534	Gcn52	gcn5 histone acetyltransferase; clone image:3491089
11 NM_020004			
11 AK011747	11921	Alon1	malh-1 protein
11 NM_007500	12671	Chrm3	ACH3_MOUSE Muscarinic acetylcholine receptor M3 (Mm3 mAChR) 100 % /
11 NM_033269	76428		RIKEN cDNA 2310007H09 gene
11 AK009207	80877	Ltb6	lab300 protein
11 NM_030695	11596	Ager	advanced glycosylation end product-specific receptor
11 AF030001			
11 NM_028119			
11 BC005574	17158	Man2a1	mannosidase 2 alpha man2a1
11 NM_008549			
11 AK004004			
11 AK008516	60600	Halspx	halapx-1 haploid specific alanine-rich acidic protein
11 NM_021898	66242	Mrs16	riken cdna 1500011e11 1500011e11 rtk
11 BC005625	55950	Brc3	b3 protein
11 NM_025440	76820		RIKEN cDNA 2410157M17 gene
11 NM_018772			
11 AK010621			
11 NM_013529			
11 AK006136			
11 NM_019677			
11 AK006136			
11 AK003939	68880	Cg10671	Cg10671 like (Drosophila)
11 NM_008187			
11 NM_009320	21356	Slc5a6	solute carrier family 5 neurotransmitter transporter laurine member slc5a6; mus cockli laurine/beta-stanine
11 NM_008479	16768	Lag3	lymphocyte-activation gene 3
11 NM_018768			
11 NM_030253			
11 NM_020267			

FIGURE 20.18

Cluster Access	Locus	Gene	Description
11 AK019863	77634		Small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]
11 NM_023884			
11 AK008838			
11 AK017509	74281		
11 AK006894			CUSE, MOUSE Putative protein C21orf58 homolog S4.41 %
11 AK015078			
11 NM_025980			frc, fringe-like 1 (Drosophila)
11 AK018094	76157 Fcrl		RIKEN cDNA 2300002018 gene
11 AK009014	69541		
11 AK014338			
11 NM_026244			
11 AB041576	58242 Nudt11		nudix (nucleoside diphosphate linked moiety X)-type motif 11
11 AK017525			
11 AK020683			
11 NM_010244	14349 Fv1		Friend virus susceptibility 1
11 AK011950	74772		18 days embryo riken cdna clone:110012e06
11 AK003623			hair keratin acidic 5 ha5
11 V00711	53617 Krt1-24		T-box transcription factor Tbx1
11 NM_016680	21380 Tbx1		
11 AF326960			heterogeneous nuclear ribonucleoprotein c hnrcp
11 AK015742	15381 Hmnc		
11 NM_016684			
11 AF342737			
11 AK019434			
11 NM_008133	14661 Glud		glut glutamate dehydrogenase
11 NM_013617	18366 Olfr65		olfactory receptor 65 olfr65
11 AK018159			
11 NM_009197	20502 Slc16a2		soluble carrier family 16 monocarboxylic acid transporters member 2 slc16a2
11 NM_011916	24127 Xrn1		5-3 exoribonuclease 1
11 AF187099	69049 Cnd5		Carnello-like 5
11 AK003824	68621		MTDC_HUMAN Bifunctional methylenetetrahydrofolate dehydrogenase/cyclohydrolase, mitochondrial precursor 74 %
11 X76290	20423 Shh		chondrocyte activity, growth factor activity...
11 MG4067	12151 Bmi1		B lymphoma Mo-MLV insertion region 1
11 AK014025	67285 Sdcag10		serologically defined colon cancer antigen 10
11 BC002163	170658 Nduv55		NADH dehydrogenase (ubiquinone) Fe-S protein 5
11 AK007086	74285		RIKEN cDNA 1700095K08 gene
11 NM_023514			
11 AK016612			
11 NM_029621			
11 NM_010340	14765 Gpr50		G-protein-coupled receptor 50
11 NM_020563			
11 AK002389			
11 NM_018754	55948 Mkrn3		tyrosine 3-monooxygenase/tryptophan 5-monooxygenase activation protein sigma polypeptide ywhas: 14-3-3 mme1
11 NM_024469			
11 NM_008821	18630 Pel2		plasmacytoma expressed transcript 2
11 NM_025462			
11 AK015743			
11 AK018470			
11 NM_026428			
11 AK019508	78249		cadherin EGF LAG seven-pass G-type receptor 1; cadherin EGF LAG seven-pass G-type receptor (25% Mus musculus)
11 AK014500	77047		Similar to cytoplasmic dynein heavy chain 2 [88% Rattus norvegicus]
11 AK011555			
11 AK008388			
11 AK011185	72125		Similar to CGH2V collagen alpha 2(V) chain precursor - human 30%
11 AK011565	69904		RIKEN cDNA 2610027F03 gene
11 BC012251			
11 NM_011973			
11 NM_013732			
11 NM_007922			
11 NM_025736			
11 AF220294	13712 Elk1		elk1 member of ets oncogene family
11 AK019591			
11 NM_008968	19223 Ptgfs		prostaglandin 12 prostacyclin synthase pigis
11 AK017421	71400		A38647 glutamine/glutamate-rich protein form A, submandibular gland - rat 31 % /

FIGURE 20-19

Cluster	Access	Locus	Gene	Description
11	NM_033270	50496	E2f6	e2f-like transcriptional repressor protein ena
11	AK008226	103850	Nf5m	5,3-nucleotidase, mitochondrial
11	AK005962	69379		Similar to CO60_HUMAN Complement component C8 gamma chain precursor 73 % human
11	AK012765			
11	NM_019695	18183	Nrg3	neuregulin 3
11	NM_008734	15510	Hsp60	hsp60 protein clones 313-7 -9 and -m1 555 aa; cheat shock 65
11	X55023	21665	Tdg	thymine DNA glycosylase
11	NM_011581	57738	Sic15a2	solute carrier family 15 (H+/peptide transporter), member 2
11	NM_021301			
11	NM_026119			
11	NM_023625	71159		Moloney leukemia virus 10-like 1 [Mus musculus] 37.37
11	AK016833	75894		KIAA0547 gene product [80% Homo sapiens]
11	AK016299	81799	Cors	collagenous repeat-containing sequence of 28kda protein cons26 putative secretory
11	NM_030988	53601	Pcdh12	protodesherin 12 pcdh12
11	NM_017378			
11	AK017758	69106		stomatin-like 1; stomatin-like protein 1 (79% human)
11	AK007508	19113	Pripe	prolactin-like protein E
11	NM_008930	14186	Fgr4	fibroblast growth factor receptor 4 (fgr-4 novel member of factor family
11	NM_008011	228801		von Ebner minor salivary gland protein
11	U46068			transforming growth factor beta receptor 1
11	NM_009370	21812	Tgfr1	
11	NM_009445	66618		138191 nucleic acid binding protein - human (fragment) 88 % human
11	AK011937	16703	Krtap8-1	keratin associated protein 8-1
11	D86423			
11	NM_031396			
11	AK020207			
11	NM_019914			
11	NM_031182			
11	AK005182			
11	NM_020623	19226	Pth	parathyroid hormone precursor pth
11	BC016102	21353	Tonk	traf family member associated nt-kappa b activator tank; traf-interacting protein 1-traf
11	NM_011529			
12	NM_024260	13824	Edb4.14a	erythrocyte protein band 4.1-like 4a
12	BC007166	54167	Icos	inducible T-cell co-stimulator
12	NM_017480	60530	Fign1	figitin-like 1; fign1 asa family protein
12	NM_021891			
12	AK018593			
12	BC002251	71287		A31589 carboxypeptidase C (EC 3.4.16.5) precursor - human 39 %
12	AK017087			
12	AK007781	13163	Daxx	Fas death domain-associated protein
12	NM_007829			
12	NM_010016			
12	NM_013556			
12	AK011326	70308		RIKEN cDNA 2610005M20 gene
12	NM_007928	13728	Merk2	MAPK/microtubule affinity-regulating kinase 2
12	AK017820	27395	Mrip15	mitochondrial ribosomal protein L15
12	NM_019960			
12	NM_018766	18216	Nlsr	neurotensin receptor
12	NM_011958	26443	Psma6	proteasome protease macropain subunit alpha type 6
12	AK007718	69168		CGI-143 protein [Homo sapiens] 81 % /
12	NC_001569	17722	mi-Nd6	Mus musculus mitochondrion, complete genome
12	AK020067	68148		Mus musculus 13 days embryo male testis cDNA, RIKEN full-length enriched library, clone 5030449J20 product: hypothetical protein
12	NM_028069	67281	Rqk37	ribosomal protein L37
12	NM_011594	21858	Timp2	timp-2 tissue inhibitor of metalloproteinases type: metalloproteinase
12	AK003305	68453	Cgphb1	GPI-anchored HDL-binding protein 1
12	AK005073	18012	Neurod1	adult male cerebellum riken cDNA clone: 1500032024
12	NM_010813	17428	Nhl	rox protein protein rich basic helix-loop-helix leucine zipper protein; myc antagonist1 rml mas-network bhlhzip
12	NM_008811	18598	Ptha2	adult male testis riken cDNA clone: 1700025113; pyruvate dehydrogenase ptha-2
12	AK008392	70261	Chp2	calcineurin B homologous protein 2
12	AK020306			
12	NM_018783	54723	Tip39	tuftelin-interacting protein 39 tip39
12	AK017385			
12	NM_026667			days neonate head riken cDNA clone: 5430425406; 9130005n14 9130005n14rik
12	AF291660	68303		

FIGURE 20-20

Cluster Access	Locus	Gene	Description
12 NM_013779	27385	Mig6l2	melanoma antigen, family L, 2
12 AK015254	74638		adult male testis riken cDNA clone:4930430x04
12 AK013580			
12 AK008793			
12 NM_013562	22242	Umod	uromodulin
12 BC012973	13445	Cdkap1	CDK2 (cyclin-dependent kinase 2)-associated protein 1
12 AK004852	20090	Rps29	ribosomal protein s29
12 NM_009093			
12 AK007175	71469		RIKEN cDNA 8430416G17 gene
12 AK018420			
12 NM_011631	16659	Lgal3g	lectin, galactose binding, soluble 9
12 NM_010708	78723		RIKEN cDNA D530049N12 gene
12 AK021319	68327		T45061 hypothetical protein c316G12.2 [imported] - 73% human
12 AK003209	106628	Tripl10	thyroid hormone receptor interactor 10
12 BC003249	77536		similar to -pr:T31100 - T31100 probable potassium channel 2 - rat 89 %
12 AK021149	14191	Fgr	Gardner-Rasheed feline sarcoma viral (Fgr) oncogene homolog
12 NM_010208	14284	Fosl2	fos-related antigen-2
12 NM_008037	56758	Mbrt	muscleblind-like (Drosophila)
12 NM_020007	69286		JC4131 glioma pathogenesis-related protein - human 40 %
12 AK005860			
12 NM_026047	71546		S12207 hypothetical protein (B2 element) - mouse (68% human)
12 AK018561			interferon-gamma (multi-gamma)
12 K00063	13978	Ilmg	
12 AK015259			
12 NM_021503	59006	Myozl2	myozenin-like myozl2
12 NM_018575	56214	Scamp4	secretory carrier membrane protein 4
12 NM_008798	18566	Pdcd1	programmed cell death pcd1
12 NM_027702			
12 NM_026632			
12 NM_008622	17527	Mov17	mov17
12 AF20460	65115	Bean	brain expressed, associated with Nedda
12 AK020635	108903	Tbcd	tubulin-specific chaperone d
12 X81632			
12 NM_021565	59090	Mldn	midnolin
12 L29479			
12 AK019737	76807		RIKEN cDNA 4930544L04 gene

Figure 20-21

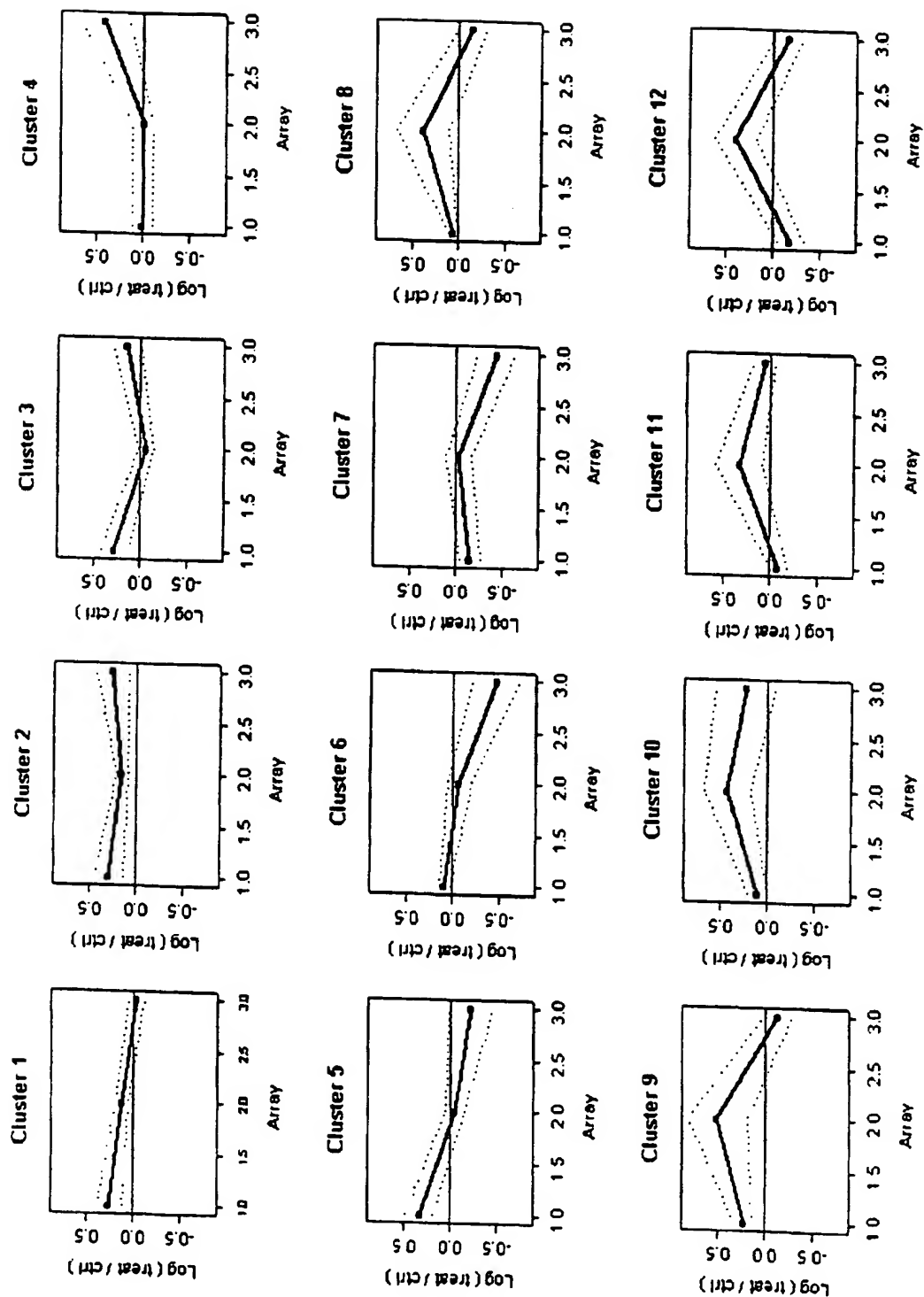


FIGURE 21-1

cluster analysis II
breast cancer
hypothalamus

Cluster	Access	Locus	Gene	Description
1	AK012535	101513		expressed sequence A1256456
1	AK002774	72114		hypothetical protein MGC15435 [Homo sapiens] 51 %
1	NM_020606	57342	Ptprn	parva, alpha
1	NM_030553	80706	Olfrl160	Olfrl160
1	NM_008301	155132	Hsp92	heat shock protein 2
1	AF233580	107352	Bmrk1	breast cancer metastasis-suppressor 1
1	NM_009237	20675	Six3	SRY-box containing gene 3
1	NM_013516	14126	Msd1	masi-cell high affinity rge receptor for-epsilon-r beta subunit
1	BC009141	75062	Ndub5	splicing factor 3a subunit 3 60kd clone mgc:11648; adult male testis riken cDNA clone:4930512k19
1	NM_025316	65046		NAOH dehydrogenase (ubiquinone) 1 beta subcomplex
1	NM_023755	81879	Ctr1	transcription repressor ctr1-1 developmentally regulated related to the cp2 family of factors
1	AK017530	70502		RIKEN cDNA 5730409E15 gene
1	AK066472	74239		Rab6-interacting protein 2 [Mus musculus] 23.35 %
1	NM_028169	72297	B3gm3	UDP-GlcNAc:betaGal beta-1,3-N-acetylglucosaminyltransferase 3
1	NM_013652	20303	Cd4	chemokine (C-C motif) ligand 4
1	AK004552	71712		Similar to hypothetical protein FLJ11259 [Homo sapiens] 93 %
1	NM_013706	23833	Cd52	COS2 antigen
1	NM_019745	56426	Pcdn10	programmed cell death 10
1	NM_010909	18038	Nfxb1	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
1	NM_022024	63986	Gmfg	glia maturation factor, gamma
1	NM_019991	56635	Prpjm	prolactin-like protein M
1	AJ297743	30934	Tor1b	torsin family 1, member B
1	AK009749	69654		DYNLC HUMAN Dynactin complex 50 kDa subunit (50 kDa dynein-associated polypeptide) (Dynamilin) (DCTN-04 %
1	AK011897	72495		RIKEN cDNA 2610206C17 gene
1	NM_026309	87678	Fap	LSM3, HUMAN U6 snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
1	NM_007986	14089		fibroblast activation protein
2	AK004934	17774		Similar to APXL_HUMAN Apical-like protein (APXL protein) humana 28 %
2	AF358257	70967		146k11 CL288 protein - rat (31 % R.norvegicus)
2	NM_011856	23964	Od22	odd Oz/len-m homolog 2 (Drosophila)
2	AK007540	69769		hypothetical protein FLJ23467 [Homo sapiens] 93 %
2	NM_008642	17777	Milp	microsomal triglyceride transfer protein
2	NM_023175	52633		Nit protein 2 [89% Homo sapiens]
2	AK018435	71463		18 days embryo lung riken cDNA clone:8430422m09
2	AK004371	68895		RAP2A, member of RAS oncogene family; RAP2, member of RAS oncogene family (K-rev); K-REV [Homo sapi] 38 %
2	NM_030735	81010	V3R9	phenomone receptor V3R9
2	AK021182	77616		RIKEN cDNA C33006D17 gene
2	NM_020595	57329	Olor	oxoraplin [Mus musculus] 100 %
2	AK010471	69878		RIKEN cDNA 1110068E08 gene
2	NM_021481	59866	Treh	trehalase (brush-border membrane glycoprotein)
2	NM_011992	26611	Rcn2	reticulocalbin 2
2	BC004630	216549		hypothetical protein FLJ20080 [Homo sapiens] 78.35 %
2	AK004960	67958		Similar to PRP1_HUMAN Sarvary protein-rich protein precursor (Clones CP3, CP4 and CP5) [Basic pepid] 35 % human
2	NM_026768	68565	Mrps18a	mitochondrial ribosomal protein S18A
2	NM_026613	68201		hypothetical protein MGC14827 (85% human)
2	AK009387	69578		RIKEN cDNA 2310016G11 gene
2	AK016497	70980		RIKEN cDNA 4931431F19 gene
2	NM_023831	76568		RIKEN cDNA 1500035H01 gene
2	AK015385	74673		RIKEN cDNA 4930451F05 gene
2	NM_015804	50770	Alp11a	ATPase, class VI, type 11A
2	NM_026630	68236		Mus musculus RIKEN cDNA 2410116G06 gene (2410116G06Rik)
2	AK014404	74014		double C2, beta
2	NM_007873	13447	Dac2b	Similar to - HIV TAT specific factor 1; cofactor required for Tat activation of HIV-1 transcription [74% Homo sapiens]
2	AK011234	72459		RIKEN cDNA 2010012C09 gene
2	BC005775	66440	Actb	actin, beta, cytoplasmic
2	NM_007393	11461	Olfrl159	olfactory receptor 159
2	NM_019476	29849		hypothetical protein 1-82 [100% Mus musculus]
2	NM_019833	56279		Similar to Ubiquitin-conjugating enzyme E2-23 kDa (Ubiquitin-protein ligase) [42% mouse]
2	AK015348	66799		sp P46096 - SYT1_MOUSE Synaptotagmin 1 (Sytl) (p65) 38 %
3	AK021036	77314		cullin 2
3	AK016520	71745	Cu2	Fanconi anemia, complementation group G
3	NM_053081	60534	Fancg	T12515 hypothetical protein DKF Zp434B103.1 - (28% human)
3	AK014505	70892		

FIGURE 21-2

Cluster	Access	Locus	Gene	Description
3	AK019795	71832		YA02_HUMAN HYPOTHETICAL PROTEIN DJ119846.2 (50% HUMAN)
3	NM_025844	68917	Chordc1	cysteine and histidine-rich domain (CHORD)-containing, zinc-binding protein 1
3	NM_033080	110959		DNA segment, Chr 7, Roswell Park 2 complex, expressed
3	AK010337	74322	Cgfp	CPG binding protein
3	AK006551	67876		hypothetical protein FLJ13448 [Homo sapiens] 84 %
3	AK007415	73634		CHD1_MOUSE CHROMODOMAIN-HELICASE-DNA-BINDING PROTEIN 1 (CHD-1) 40 %
3	NM_020592	20239	Scat2	serinocerebellar alaxia 2 homolog (human)
3	NM_009125	72114		Similar to zinc finger, BED domain containing 3 (ZBED3) [51% Homo sapiens]
3	AK011319	72381	Fh1	2119399A elongin B [Homo sapiens] 72 %
3	NM_028218	14194		fumarate hydratase 1
3	BC006048	14194		protein phosphatase 1, regulatory (inhibitor) subunit 3F [83% Homo sapiens]
3	AK017931	74753		colicador required for Sp1 transcriptional activation subunit 2 (150 kDa) [69.57% Mus musculus]
3	AF229644	54646	Gmpa	guanine nucleotide releasing protein x
3	AK020621	78670		proteasome (prosome, macropain) subunit, alpha type 3
3	AK007657	69151	Pma3	tripartite motif protein trim11
3	NM_011184	19167	Trim11	PCPI_HUMAN Probable pyruvate-carboxylate peptidase (5-oxopropyl-peptidase) [Pyroglutamy-peptidase 95 %
3	NM_053168	94091		sodium channel, voltage-gated, type IX, alpha polypeptide
4	NM_023217	66577	Scn9a	casein kinase 1, epsilon
4	NM_018852	20774	Csk1e	CGI-94 protein
4	NM_013767	27373	Cg94	JC6547 high sulfur protein B2E - rat 37 %
4	NM_026031	67205		Mouse 6 days neonatal head cDNA, RIKEN full-length enriched library, clone:5430417C01 product: hypothetical
4	NM_027170	69696		nucln 10, submandibular gland salivary mucin [Mus musculus] 30 %
4	AK019946	76548		RIKEN cDNA 1700066J14 gene
4	AK007868	72056	Kcnab3	potassium voltage-gated channel, shaker-related subfamily, beta member 3
4	AK005678	321010	H2-M1	histocompatibility 2, M region locus 1
4	NM_010599	16499		RIKEN cDNA 4930556J24 gene
4	M20985	224756		complement component 1, q subcomponent, gamma polypeptide
4	AK016148	75342	C1qg	903067L17RA RIKEN cDNA 9030607L17 gene
4	NM_007574	12202		RIKEN cDNA 4930519F16 gene
4	AK018541	71564		DNA segment, Chr 8, ERATO D01 633, expressed
4	AK015842	75106	Sema6b	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6B
4	AK017529	52447	Unc84a	unc-84 homolog A (C. elegans)
4	NM_013662	20359	Pcal	p300/CBP-associated factor
4	AF343752	77053		cop2 1 nonclathrin coat protein zeta-cop
4	NM_020005	18519	Cop21	bone marrow stromal cell antigen 1
4	NM_019817	56447	Bst1	twist gene homolog 1 (Drosophila)
5	NM_009763	12182		interleukin-10 receptor alpha
5	NM_011658	22160	Twis1	RIKEN cDNA 6330583M11 gene
5	NM_008348	16154	Il10ra	achaele-scul complex homolog-like 2 (Drosophila)
5	NM_024465	76192		anterior gradient 2 (Xenopus laevis)
5	NM_008554	17173	Ascl2	bulkyprotein, subfamily 1, member A1
5	NM_011783	23795	Apr2	ectoparasitic conc. invasive leishmaniasis giant cells, extraembryonic ectoderm and chorion sequence 3
5	NM_013483	12231	Btla1	caspase 8 associated protein 2
5	NM_025310	56095	Epc3	growth differentiation factor-5b gdf-5b; bone morphogenetic protein 15 bmp15
5	NM_011997	28885	Casp3	2-cell-stage, variable group, member 1; variable group of 2-cell-stage gene family
5	NM_009757	12155	Bmp15	insulin-like growth factor 1 receptor tgf1
5	AF067063	16001	Igf1r	Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
5	AF056187	76797		C-terminal PDZ domain ligand of neuronal nitric oxide synthase
5	AK010800	76797	Serpine2	chemokine (C motif) receptor 1
5	NM_008255	20720	Capon	HSPC038 protein [Homo sapiens] 100 %
5	AK018149	70729	Xcr1	cholesterol A receptor
5	NM_011798	23832		poliovirus receptor-related 3
5	AK004076	68036	Cckar	putative seven transmembrane spanning receptor puna-g
5	NM_009827	12435	Puna-g	RIKEN cDNA 5730513H21 gene
5	NM_021496	58988		vaccinia related kinase 2
5	NM_030701	80885		BC12-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
5	AK017769	70614	Vrk2	neuregulin 4 nrg4
5	AK012664	69922		mdj10 deduced amino acid sequence of is homologous to c. elegans putative dna] protein z73102 b0035.14, homolog
5	AK017362	75736	Nrg4	RIKEN cDNA 2010107K23 gene
5	NM_032002	83961		
5	NM_015965	56709	Ornab12	
5	NM_023788	75625		

FIGURE 21-3

Cluster	Access	Locus	Gene	Description
5	NM_009838	12466	Ccrla	chaperonin subunit 6a (zeta)
5	NM_010351	14838	Gsc	goosecoid gsc
6	NM_026352	67738	Pipd	peptidylprolyl isomerase D (cyclophilin D)
6	AK019807	78052		RIKEN cDNA 493057D21 gene
6	NM_011203	19248	Pipn12	protein tyrosine phosphatase, non-receptor type 12
6	NM_008669	17939	Naga	N-acetyl galactosaminidase, alpha
6	AK021025	78687		Musca 4 deva neonate male adipose cDNA, RIKEN full-length enriched library, clone B430316417 product: hypothetical
6	NM_021522	59025	Usp14	ubiquitin specific protease 14
6	AF061744	23880	Fyb	fyv binding protein-130
6	AK009285	72181		Ad898 nuclear protein p120 - mouse (fragment) 33 %
6	AJ242625	13406	Dmp1	dentin matrix protein 1
6	NM_013584	16880	Lifr	leukemia inhibitory factor receptor
6	NM_011505	20913	Sixbp4	synixin binding protein 4
6	AK006925	73473		RIKEN cDNA 170069O15 gene
6	NM_019498	56068	Amnec1	Alport syndrome, mental retardation, midface hypoplasia and elliptocytosis chrom. region gene 1 homolog (human)
6	AF282302	258434	MOR224-6	olfactory receptor MOR224-6
6	NM_013728	27216	Olfir154	olfactory receptor 154
6	AK011279	69885		phosphatidylglycerophosphate synthase 1
6	AK011463	74451	Pps1	mutS homolog 6 (E. coli)
6	NM_010830	17688	Ms6	cadherin cdh6
6	NM_007666	12563	Cdh6	T-cell receptor beta, variable V20
6	X59150	21594	Tcrb-V20	hypothetical protein, 154
6	NM_020555	57428		Niemann Pick type C2
6	NM_023409	67963	npc2	UDP-Gal:betaGlcNAc beta 1,3-galactosyltransferase, polypeptide 5
6	NM_033149	93961	B3gal5	SMC2 structural maintenance of chromosomes 2-like 1 (yeast)
6	NM_008017	14211	Smc211	B lymphoid kinase
6	NM_007549	12143	Blk	polymerase (DNA directed), beta
6	NM_011972	26447	Poli	amyloid beta (A4) precursor protein-binding, family A, member 3
6	NM_018758	52767	Acb3	protease, serine, 11 (trp binding)
6	NM_019564	56213	Prss11	A53202 cyclophilin C-associated protein MAMACyCAP precursor - mouse 26.12 %
6	AK005160	72014	Adam28	a disintegrin and metalloprotease domain 26 (testis 3)
6	AF167404	13525	Pou3f2	POU domain, class 3, transcription factor 2
6	NM_008899	18992	Pou3f2	olfactory receptor 67
6	NM_013619	18368	Chf67	Similar to mammalian inositol hexakisphosphate kinase 2 [Homo sapiens] 91 %
7	AK005166	76500		RIKEN cDNA 2410001E19 gene
7	AK010322	71989		pellino 1-ref:NP_075813.1 - pellino 1; RIKEN cDNA 2810468L03 gene [Mus musculus] 100 %
7	AK020915	67245	Peli1	Purkinje cell protein 4
7	NM_008791	18546	Pcp4	Oulard homolog (Xenopus laevis)
7	AK012063	67181	Dulard	choline kinase-like
7	NM_007692	12651	Chk1	Tetraspan NET-6 (95% human)
7	AK012571	68109		Claudin 4
7	NM_009903	12740	Cldn4	ATP-binding cassette, sub-family A (ABC1), member 1
7	NM_013454	11303	Abca1	mitochondrial ribosomal protein S18C; C51-134 protein; mitochondrial ribosomal protein S18-1 [Homo 78 %
7	AK004139	68735		CDC42 effector protein (Rho GTPase binding) 5
7	NM_021454	58604	Cdc42ep5	hypothetical protein FLJ22353 [Homo sapiens] 85 %
7	AK004164	68777		pir:142647 - T42647 hypothetical protein DKFZp434A2115.1 - human (fragment) 92 %
7	AK019542	68259		expressed sequence A148222
7	AK018444	52504		EH-domain containing 3
7	NM_020578	57440	Ehd3	Similar to nuclear prelamins A recognition factor, isoform s [84% Homo sapiens]
7	AK013432	67608		alpha collagen iv col4a3
7	NM_007734	12828	Col4a3	FXVD domain-containing ion transport regulator 7
7	AK020739	57780	hyr7	CA00_HUMAN Protein CGI-100 precursor (89% human)
7	NM_022007	73130		peroxisomal biogenesis factor 11b
7	AK014480	18532	Pex11b	gamma-aminobutyric acid gaba-a receptor subunit beta 2 gabrb2
7	NM_011069	14401	Gabrb2	polymerase (RNA) II (DNA directed) polypeptide C
8	BC003765	67710	Poir2g	hypothetical protein FLJ23045 [26% Homo sapiens]
8	NM_026329	74478		hypothetical protein DKFZp586E1923 [Homo sapiens] 88 %
8	AF399755	66291		RIKEN cDNA 3110041O18 gene
8	NM_025471	73166		DnaJ (Hsp40) homolog, subfamily B, member 7
8	BC014769	73166		
8	AK006201	57755	DnaJb7	

FIGURE 21-4

Cluster	Access	Locus	Gene	Description
8	AK006727	67003		adult male testis riken cdna clone: 1700048h20; clone:4933432e16
8	AK017633	75708	Tex20	testis expressed gene 20
8	NM_011970	26445	Psmb2	proteasome (prosome, macropain) subunit, beta type 2
8	NM_008733	17175	Nkap	nebulin-related anchoring protein
8	AK017767	66653	Brf2	BRF2, subunit of RNA polymerase III transcription initiation factor, BRF 1-like
8	AK015993	75156		RIKEN cDNA 4930539A06 gene
8	NM_008947	19179	Psmc1	protease (prosome, macropain) 26S subunit, ATPase 1
8	NM_019421	54218		hypothetical protein 425018-1
8	X85606	18422	Oit1	ovary testis transcribed
8	AB012265	22504	Wiz	widely-interspaced zinc finger motifs
8	AK006382	75547		RIKEN cDNA 1700026G02 gene
8	AK006449	71870	Nesg1	nasopharyngeal epithelium specific protein 1
8	Y19185	26875	Pcdo	peccato (presynaptic cytomatrix protein)
8	AK012224	76795		vascular Rab-GAP/TBC-containing; BUR2-like protein 1 [Mus musculus] 46.54 %
8	AC079832	71749	Adh6-ps1	alcohol dehydrogenase 6 (class VI, pseudogene 1)
8	NM_008653	17868	Myhpc3	myosin binding protein C, cardiac
8	NM_009846	12484	Cd24a	CD24a antigen
8	NM_017374	18053	Pdp2cb	protein phosphatase 2a, catalytic subunit, beta isoform
8	NM_016876	53356	Eif3a4	eukaryotic translation initiation factor 3, subunit 4 (delta)
8	AF281870	64008	Syne1	synaptic nuclear envelope 1
8	NM_010128	13730	Emp1	epithelial membrane protein-1
8	AK008108	72043	Sulf2	sulfatase 2
8	NM_019924	56613	Rps6ka4	ribosomal protein S6 kinase
8	AK017568	70557		RIKEN cDNA 5730416Q20 gene
8	NM_033476	21422	Tcfcp2	alpha-globin transcription factor cb2
8	NM_007620	12408	Clu1	carbonyl reductase 1
8	NM_009843	12477	Cit4a	cytotoxic T-lymphocyte-associated protein 4
8	NM_021310	57748	Jmy	junction-mediated and regulatory protein
8	NM_054096	117149	Trap	tdf-interleukin 1 receptor (TIR) domain-containing adaptor protein
8	NM_025523	66377	nduc1	NADH dehydrogenase (ubiquinone) 1, subcomplex unknown, 1
8	X13721	15416	Ho-bb	homeo box b8
8	NM_013908	30839	Fbw5	F-box and WD-40 domain protein 5
8	NM_018809	19213	Pf1f9	pancreas specific transcription factor, 1a
8	AK015924	75178		RIKEN cDNA 4930528F23 gene
8	AF276974	192201		RIKEN cDNA 9230106L14 gene
8	NM_019676	18799	Picd	phospholipase C, delta
8	NM_007525	12021	Bard1	BRCA1 associated RING domain 1
8	AK021412	78547		hypothetical protein FLJ23119 [66% human]
8	NM_008847	18720	Pip5k1b	phosphatidylinositol 4-phosphate 5-kinase, type 1 beta
8	AK017158	75865		rac [Homo sapiens] 60 %
8	AK016812	74085	Fbx12	S10151 transforming protein (tm - 56% mouse (strain balb/c)
8	NM_013911	30843	Tulp4	lubby super-family protein tulp
8	NM_054040	68842		RIKEN cDNA 4933400B08 gene
8	AK005865	71020	Pik3c2a	phosphatidylinositol 3-kinase, C2 domain containing, alpha polypeptide
8	NM_011083	18704	Chna6	nicotinic acetylcholine receptor subunit alpha6 nica6
8	NM_021369	11440		Similar to SUS2_HUMAN SUMO-1-specific protease 2 (Sentrin-specific protease SENP7) 45%
8	AK012740	66315		RIKEN cDNA 6330415F13 gene
8	BC007185	70747		RIKEN cDNA 2310004L02 gene
8	NM_025504	66349	Vti1b	vesicle transport through interaction with t-snares 1b homolog
8	NM_016800	53612	Capn10	calpain 10
8	BC005681	23830		hypothetical protein MGC10771 [78% Homo sapiens]
8	AK014667	74577		RIKEN cDNA 0510011D08 gene
8	NM_025647	66588		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933409K03 product:hypothetical Hesi shoot protein hsp70/Ankyrin-repeat/Yeast DNA-binding domain
8	AK016157	73844		cyclic nucleotide gated channel cnga
8	NM_007724	12789	Cncg4	T09013 RING finger protein Fxy - 24% mouse
8	AK019654	78911		Similar to hypothetical protein FLJ10587 [Homo sapiens] 98 %
8	AK004714	74133	Gpr37	G protein-coupled receptor 37
8	NM_010338	14763	Sdcs2i	steroid 5 alpha-reductase 2-like; HSAR gene; steroid 5 alpha-reductase 2 like [Mus musculus] 100 %
8	NM_020611	57357	Pd11r	placental protein 11 related
8	NM_008902	19011		signal recognition particle 14
8	NM_009273	28613		neuronal pentraxin 2 npbx2; np2
8	NM_016789	53324	Npx2	

FIGURE 21-5

Cluster	Access	Locus	Gene	Description
9	AK009918	69681	Cdk3	cyclin-dependent kinase 3
9	AK008397	72061		A30325 membrane alanine aminopeptidase (EC 3.4.11.2) precursor - human 24%
9	NM_019825	56406	Ncoa6	nuclear receptor coactivator 6
9	NM_007787	12937	Pcdha6	protocadherin alpha 6
9	NM_016881	54132	Podl1	PDZ and LIM domain 1 (elfin)
9	NM_024414	56216	Slc1b2	synaptobrevin 2, syntaxin 1 b [Mus musculus] 100 %
9	AK016810	71138		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933413N12
9	AK009362	96650		NICE-3 protein [Homo sapiens] 82 %
9	NM_026353	67739		RIKEN cDNA 4930570C03 gene
9	NM_009477	16709	Kln1	kinectin 1
9	AK019972	70078		ref:NP_057251.2 - retinoic acid repressible protein (Homo sapiens) 70 %
9	AK016466	70965	Edps	pleckstrin and Sec7 domain protein [56% Homo sapiens]
9	AF108020	14739		endothelial differentiation, sphingolipid G-protein-coupled receptor, 5
9	NM_021291	30962	Slc7b9	solute carrier family 7 (cationic amino acid transporter, y+ system), member 9
10	BC004640	97064		transcriptional co-activator with PDZ-binding motif (TAZ) [91% Homo sapiens]
10	NM_023485	68828	Sync	syncytin, dysintegrin binding protein
10	NM_018689	55381	Pigo	phosphatidylinositol glycan class b
10	NM_025476	66302		RIKEN cDNA 2410005O16 gene
10	AK009592	71883		AD16_HUMAN Protein AD-016 (Protein CGI-116) (x0009) 80 % /
10	AK004206	67282	Smyd3	SET and MYND domain containing 3
10	AK010447	69726		RIKEN cDNA 8430431K14 gene
10	AK020237	78103	Lamb3	laminin, beta 3
10	NM_008484	16780		FXP3_MOUSE Forkhead box protein P3 (Scurlin) 100 %
10	NM_054039	20371	Foxp3	unknown
10	AF226663	231841		small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]
10	AK018663	77634	Sdy	senescence protein 3
10	NM_016717	50880	PhoD3	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3
10	NM_011962	26438	Gnt2	glucosaminyltransferase, 1-branching enzyme
10	AB037586	14538		Mouse adult male hippocampus cDNA, RIKEN full-length enriched library, clone:2900024P18 product:hypothetical Protein/Alkaligen containing protein
10	AK013585	72871	Sich	stress 70 protein chaperone, microsome-associated, human homolog
10	AK021006	110920	Oyfr	opioid growth factor receptor
10	NM_031373	72075		RIKEN cDNA 2410019A14 gene
10	AK010555	69746	B3gal3	UDP-Gal4betaGlcNAc beta 1,3-galactosyltransferase, polypeptide 3
10	NM_020026	26879		chromosome 12 open reading frame 2, carcinoma associated [99% Homo sapiens]
10	AK017214	71323		17 days embryo head riken cDNA clone:3300002a11
10	AK014365	71823	Spin4	spinradin beta 4
10	AY032655	80297	Car1	carbonic anhydrase 1
10	NM_009799	12346		ENC1_MOUSE Ectoderm-neural cortex-1 protein (ENC-1) 80 % /
10	AK012967	76553	Ush1c	Usher syndrome 1C homolog (human)
10	AF288326	72088		hypothetical protein MCC3234 [89% Homo sapiens]
10	BC068876	68038	Fmn2	formin 2
10	NM_019445	54418	Hcagp	chromosome condensation protein G
10	AJ237585	54392		Mus musculus adult male diencephalon cDNA, RIKEN full-length enriched library, clone:5330161L09 product:hypothetical protein
10	AK020378	77225		RIKEN cDNA 4930504H06 gene
10	AK015697	75040		RIKEN cDNA 5830443L24 gene
10	NM_029509	76074		leslie-specific c-abl protein
10	J02995	11350	Abi1	thioredoxin 2
10	NM_018913	56551	Txn2	S45251 SNF2alpha protein - 93% human
10	BC004653	67155		myeloid ecotropic viral integration site-related gene 2
10	NM_008827	17537	Mig2	heterogeneous nuclear ribonucleoprotein D-like
10	NM_016690	50926	Hnrpd	plenty of SHG domains: Plenty of SHGs [Mus musculus] 100 %
10	NM_021506	59009	Posh	RIKEN cDNA 2410066E13 gene
10	NM_026629	68235		gamma-glutamyl carboxylase
10	NM_019802	56316	Ggcr	sphingosine-1-phosphate phosphatase 1; sphingosine-1-phosphate phosphatase [Mus musculus] 100 %
10	NM_030750	51535	Sgpp1	epidermal growth factor receptor pathway substrate 15, related sequence
10	NM_007944	13859	Eps15-4	RIKEN cDNA 5830462I21 gene
10	AK018027	46106	Novat1	neuro-oncological ventral antigen 1
10	AF232828	18134		small nuclear ribonucleoprotein D3
10	NM_026095	67332	Strp3	mevalonate kinase
10	NM_023556	17855	Mva	Ellis van Creveld gene homolog (human)
10	NM_021292	59056	Evc	Ellis van Creveld gene homolog (human)
10	AK015166	74902		plectin 1, intermediate filament binding protein, 500kD [Homo sapiens] 25.74 %

FIGURE 21.6

cluster analysis II
breast cancer
hypothalamus

Cluster	Access	Locus	Gene	Description
10	NM_030744	76378	Ripn	roparion loc81026
10	NM_016693	53608	Map3k6	mitogen-activated protein kinase kinase kinase 6
10	AK016900	74457		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4933424M13 product:unclassifiable
10	NM_007903	13616	Edn3	Edn3
10	BC014706	70495	Alp6ip2	ATPase, H ⁺ transporting, lysosomal interacting protein 1
10	AF310251	83946	Php	pleckstrin homology domain interacting protein
10	AK017038	66786		
10	NM_009453	22184	U2af1r452	U2 small nuclear ribonucleoprotein auxiliary factor (U2AF), related sequence 2
10	NM_029199	75185		RIKEN cDNA 4930542N07 gene
11	NM_010482	15551	Htr1b	5-hydroxytryptamine (serotonin) receptor 1B
11	NM_019831	56364	Zfp261	zinc finger protein 261 zfp261
11	NM_007939	13942	Epha6	Eph receptor A6
11	BC004794	233575	Frgg1	FGF receptor activating protein 1
11	NM_009660	11687	Alox15	arachidonate 15-lipoxygenase
11	NM_018755	54381	Pgcp	plasma glutamate carboxypeptidase
11	NM_019800	66659	Acp6	acid phosphatase 6, lysophosphatidic
11	NM_025978	67120		RIKEN cDNA 2700016E08 gene
11	NM_008782	18507	Pax5	paired box 5 gene 5
11	AK015245	74626		RIKEN cDNA 4930429Q20 gene
11	NM_021351	12959	Cryba4	beta-a4-crystallin cyba4
11	NM_025319	60650		RIKEN cDNA 0610009B22 gene
11	NM_009177	20442	Sialda	sialyltransferase 4A (beta-galactosidase alpha-2,3-sialyltransferase)
11	NM_008956	19205	Pibp1	poly(pyrimidine tract) binding protein 1
11	BC004576	234725		
11	Y17852	14548	Gdyp3	ganglioside-induced differentiation-associated-protein 3
12	AK014128	207615		T46442 hypothetical protein DKF Zp434F2427.1 - (96.57% human)
12	NM_015760	50490	Nox4	NADPH oxidase 4
12	NM_009881	12593	Cdy1	chromodomain protein, Y chromosome-like
12	NM_008739	18193	Nsf1	nuclear receptor-binding SET-domain protein 1
12	AK002172	66425		2112359A Wickliff-Aldrich syndrome gene [Homo sapiens] 28 %
12	NM_013618	19357	Olfr66	olfactory receptor 66
12	NM_080428	50754	Fbxw7	F-box and WD-40 domain protein 7, archipelago homolog
12	AK005213	66239		truncated SON protein [Mus musculus] 34 %
12	AK015647	67397	Eip29	10 11 days embryo riken cDNA clone:2810446m09; adult male lung clone:1200015m03
12	NM_030113	78509		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930468L21 product:inferred: RIKEN cDNA 4930468L21 gene / putative [Mus musculus]
12	AK013274	19087	Pkar2a	Rho GTPase activating protein 10
12	NM_008716	18131		protein kinase, cAMP dependent regulatory, type II alpha
12	NM_025703	66684	Notch3	Notch gene homolog 3 (Drosophila)
12	AK003551	67604		pp21 homolog [Homo sapiens] 35 %
12	NM_052977	94191		CGI-20 protein [Homo sapiens] 91 %
12	NM_011500	268980	Adar3	adenosine deaminase 3, RNA dependent
12	NM_009592	13076	Slm	slidin, calmodulin binding protein
12	NM_019964	56891	Cypta1	cytochrome P450, family 1, subfamily a, polypeptide 1
12	NM_024225	69178	Dnajb8	DnaJ (Hsp40) homolog, subfamily B, member 8
12	AK020538	77397	Snrk5	sorting nexin 5
12	NM_016926	53090	Sart3	Lysozyme C, type M precursor (1,4-beta-N-acetylmuramidase C) (62% Mus musculus)
12	AK019809	78051		squamous cell carcinoma antigen recognized by T-cells 3
12	NM_007462	11789	Apc	ref:NP_057731.1 - mesenchymal stem cell protein DSCD75 [Homo sapiens] 89 %
12	AF281045	24014	Roxsd	apc putative
12	NM_010883	17986	Ndph	2,5A-dependent RNase
12	NM_010053	13390	Dit1	Norrie disease homolog
12	NM_022030	64051	Sv2a	disial-less homobox
12	NM_009502	11444	Chmb2	synaptic vesicle glycoprotein 2 a
12	AK008753	70387		cholinergic receptor, nicotinic, beta polypeptide 2 (neuronal)
12	U70033	20541		Similar to FKBP6_HUMAN FKBP6-binding protein 6 (FKBP-36) (Pepidyl-prolyl cis-trans isomerase) (PPhase) (Rolames) (R. sapiens 28%)
12				sodium calcium exchanger ncx transmembrane protein

Figure 21-7

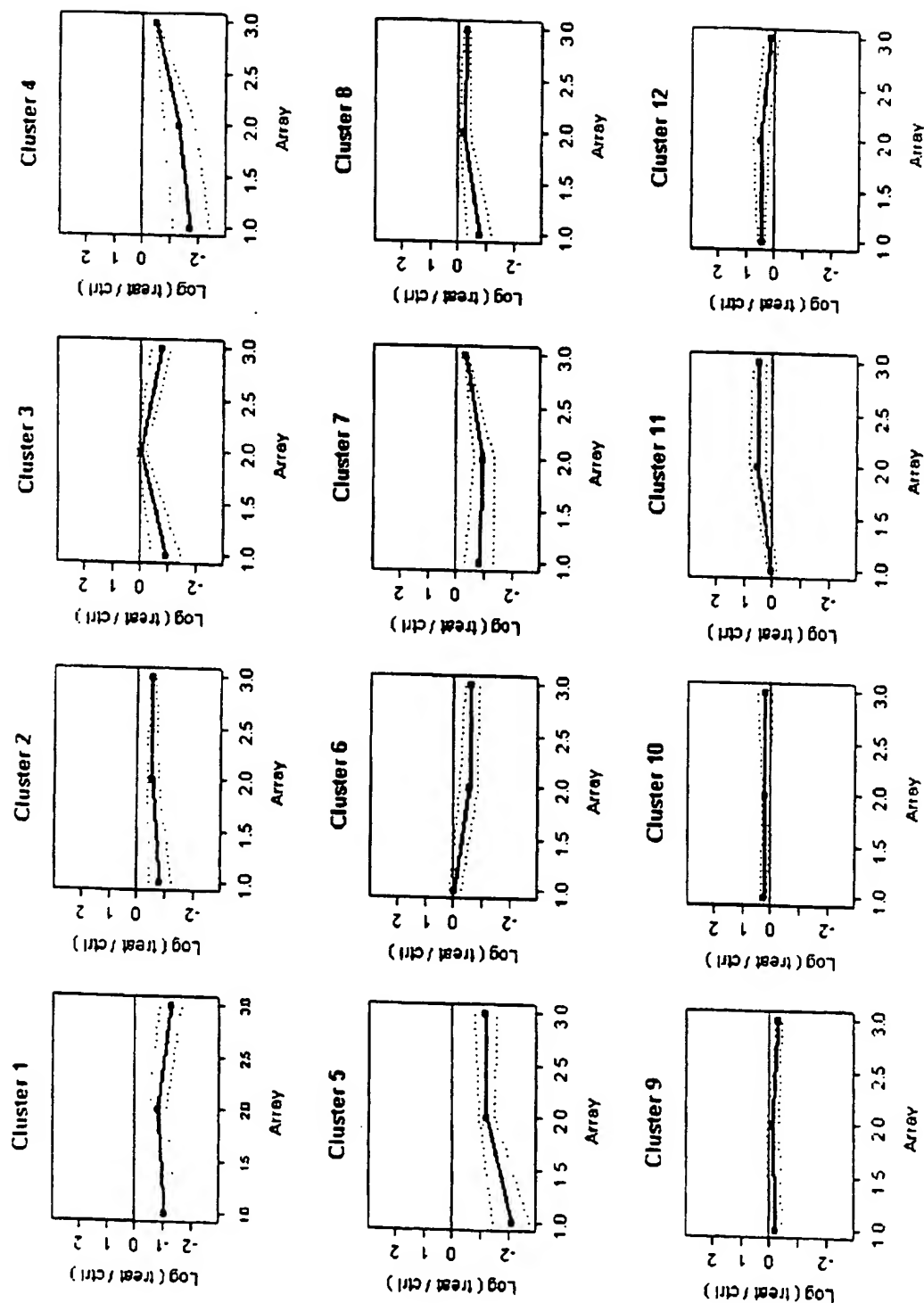


FIGURE 22-1

cluster analysis I
lung cancer
hypohalampus

Cluster Access	Locus	Gene	Description
1 X59289	213742	Xist	inactive X specific transcripts, gene with no protein product
1 NM_026161			
1 NM_007975	14065	F2r13	protease-activated receptor 4 par4 g protein-coupled receptor thrombin
1 NM_008876	18806	Pid2	phospholipase D2
1 AF167573	27374		Jak-binding protein 1
1 NM_009500	22325	Vav2	vav2 oncogene
1 NM_009167			
1 AK020007	78066		refNP_055672.1 - KIAA0471 gene product [Homo sapiens] 93.55 %
1 AK014326	70771	Sreb3	SREB3
1 NM_027884	21981	Tns	tensin
1 NM_010191	14137	Fdrl1	squalene synthase
1 NM_030251	80283	Abib1	ankyrin repeat and BTB (POZ) domain containing 1
1 AK017955	60315	Myg1	melanocyte proliferating gene 1
1 NM_025292	24071	Syn2bp	adult male small intestine riken cdna clone:2010002n14; synaptotagmin binding protein syn2bp
1 NM_026047			
1 AK016963			
1 AK003359			
1 NM_009861	12540	Cdc42	cell division cycle 42 homolog (S. cerevisiae)
1 NM_021544	20271	Scn5a	sodium channel, voltage-gated, type V, alpha polypeptide
1 NM_023617	71724		RIKEN cDNA 1200011D03 gene
1 NM_013175	83485	Ngn	f58gm upregulated with neurite growth in neuroblastoma cells; mesenchymal stem cell protein dsc92 clone mgc:7848
1 AK015642	75036		CERU_MOUSE CERULOPLASMIN PRECURSOR (FERROXIDASE) (96% Mus musculus)
1 NM_011755	22694	Zfp35	zfp-35 zinc finger protein zfp-35 aa 1-580; exon
1 AK003808			
1 NM_026664			
1 NM_010635	16596	Klf1	Kruppel-like factor 1 (erythroid)
1 NM_007542	12111	Bgn	biglycan
1 NM_010422	15212	Hexb	129/sv beta-n-acetylhexosaminidase hexb; beta-hexosaminidase beta subunit
1 NM_028842	74264		STRIN protein [Homo sapiens] 70 %
1 NM_013731	27219	Sgk2	serum/glucocorticoid regulated kinase 2
1 AK014579			
1 AK012019	67768	Nbsrnt1	putative NB-DNA-methyltransferase
1 AK016833	71159		Moloney leukemia virus 10-like 1 [Mus musculus] 37.37
1 AK008713	70388		leucine-rich and death domain containing; p53 protein induced, with death domain [Mus musculus] 40.00 %
1 AK018027	46106		RIKEN cDNA 5830462121 gene
1 NM_013539			
1 Y11717			
1 NM_031255	15400	Hoxa3	hoxa3
1 BC004027	83434	Rshl1	radial spokehead-I protein rshl1
1 AK020325	77687	Kcnq5	voltage-gated potassium channel kcnq5 member of the kcnq family; adult male epididymis riken cdna clone:9230107d05
1 U91922	13211	Ddx9	ma helicase a ddx9 and drosophila rde
1 NM_009108	20186	Nr1n4	retinoid x receptor interacting protein rip14-1 no.6 alpha isoform
1 NM_016860	54130	Actr1a	arp1 actin-related protein yeast homolog a centractin alpha clone mgc:5816; es cells riken cdna clone:2410039j03
1 NM_011025	18429	Oxt	oxytocin-neurophysin i
1 AK012635	69920	Polr2i	polymarase (RNA) II (DNA directed) polypeptide 1
1 AK005535			
1 NM_019650	56494	Gosr2	sec22 vesicle trafficking protein-like s. cerevisiae clone mgc:6437; golgi snare gs27
1 AK014543	70804		progesterone membrane binding protein [73% Homo sapiens]
1 NM_022889	64934	Pest1	pescadillo homolog containing bcl domain zebrafish pest1
1 AK018884			
1 NM_031373	72075	Ogfr	opioid growth factor receptor
1 NM_025559			
1 NM_010771			
1 L26164			
1 AJ289061			
1 NM_008399	16407	Itgae	Integrin alpha e epithelial-associated ligase
1 NM_019441			
1 AK019863	77634		small nuclear RNA activating complex, polypeptide 3, 50kD [84.95% Homo sapiens]

FIGURE 22-2

cluster analysis I
lung Cancer
hypothalamus

Cluster Access	Locus	Gene	Description
1 AK014447			
1 AK007145			
1 AK018100			
1 AK016162			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930557G23 product:homeodomain interacting protein kinase 1
1 AK005584			
1 BC011457			
1 NM_010664	16516	Kcnj15	potassium inwardly-rectifying channel subfamily j member 15 kcnj15; inwardly rectifying k+ kir4.2a
1 AK020687			
1 NM_019445	54418	Fmn2	formin 2
1 NM_023066	65973	Asph	aspartate-beta-hydroxylase asph; aspartyl beta-hydroxylase
1 NM_009091	20054	Rps15	ribosomal protein s15 rps15
1 NM_019481	55961	Slc13a1	solute carrier family 13 sodium/sulphate symporters member slc13a1
1 AK010475	69740		CGI-30 protein [Homo sapiens] 85 % /
1 NM_011478			
1 NM_011825			protein related to DAN and cerberus
1 NM_021456	23893	Prdc	
1 AK018430			
1 NM_011044	18534	Pck1	phosphoenolpyruvate carboxykinase 1, cytosolic
1 AK005730			
1 NM_007385	11425	Apoc4	apolipoprotein C-IV
1 AK009455	71910		Similar to HTPAP protein [92% Human]
1 AK012283	72569		RIKEN cDNA 2700023J09 gene
1 AK006018			
1 AK005519			
1 NM_023514			
1 AK006168			
1 S82853			
1 NM_007432	11648	Akp3	alkaline phosphatase intestine not mm requiring akp3
1 NM_015801	50767	Nle	neuropathy target esterase
1 NM_022992	65106	Arfip5	ADP-ribosylation-like factor 6 interacting protein 5
1 NM_010168	14061	F2	prothrombin protein precursor aa -43 to 575
1 NM_007563	12183	Bpgm	2,3-bisphosphoglycerate mutase
1 NM_008178	14842	Gsh1	homodimer gsh-1
1 AK002371			
1 NM_007825	13123	Cyp7b1	10 11 days embryo riken cDNA clone:281040711; cytochrome p450 7b1 cyp7b1
1 AK015001	68733		Similar to potassium voltage-gated channel, subfamily G, member 1; potassium channel KH2 [78% Homo sapiens]
1 AK016509			
1 NM_023637			
1 AK013872	72397		RNA binding motif protein 12; putative brain nuclearly-targeted protein [35.09% Homo sapiens]
1 NM_007779	12978	Csf1r	c-fms proto-oncogene protein precursor aa -19 to 957; adult male liver riken cDNA clone:1300006n20
1 NM_025633	66559	Metap1	methionine aminopeptidase-like 1
1 NM_016685	12845	Comp	cartilage oligomeric matrix protein [Mus musculus] 100 %
1 NM_011512	20932	Surf4	surfeit gene 4
1 NM_009348	21684	Tectb	tectorin beta
1 AK013281	67972		155491 adenosine triphosphatase[99% human]
1 AK019352			
1 AK016542			
1 NM_025911	67015		RIKEN cDNA 1810060J02 [Mus musculus]
2 NM_024472	79554		putative glycolipid transfer protein (25% human)
2 NM_019994			
2 NM_008406			
2 NM_008072			
2 NM_008471	16669	Krt1-19	keratin 19
2 BC004635	102607	SNXJ_HUMAN	SNXJ_HUMAN Sorting nexin 19 (84% human)
2 AK014112			
2 NM_023191			
2 NM_025597			
2 NM_007527	12028	Bax	10 11 days embryo riken cDNA clone:2810443m09; bcl2-associated x protein box

FIGURE 22-3

cluster analysis t
lung cancer
hypothalamus

Cluster Access	Locus	Gene	Description
2 NM_008285	15465	Hrh1	histamine receptor H 1
2 AK007710			
2 NM_008054	14360	Fyn	fyn proto-oncogene
2 AK009850			
2 NM_019923	16439	lipo2	inositol 1,4,5-trisphosphate receptor 2
2 NM_010185	14127	Fcer1g	mast-cell high affinity lge receptor ic-epsilon-ri gamma subunit precursor
2 NM_008829	18667	Pgr	progesterone receptor pgr
2 NM_025547	66410		CGI-12 protein (81% human)
2 AK004068	66184		RS4_HUMAN 40S ribosomal protein S4, X isoform (Single copy abundant mRNA protein) (SCR10) 93 %
2 NM_011035			
2 AK005756	74107		hypothetical protein FLJ10540 [Homo sapiens] 79.28 %
2 AK004655			
2 NM_011986	68529		18 days embryo riken cdna clone:1110019b22
2 AK003805	20344	Selp	selectin, platelet
2 NM_011347	67800	Dgal2	adult male kidney riken cdna clone:0610010b06
2 NM_026384			
2 NM_009047	19367	Rad9	RAD9 homolog (S. pombe)
2 NM_011237			
2 NM_023423	18242	Oat	ornithine aminotransferase oat
2 NM_016978	74127		adult male lung riken cdna clone:1200016g03
2 NM_028770			
2 AK005930			
2 AK018327	14664	Glyt1	glycine transporter glyt1
2 NM_008135			
2 NM_031256	14068	F7	coagulation factor vii Fvii initiation of extrinsic pathway blood coagulation serine protease
2 NM_010172			
2 AF375046	20707	Spi11	serine protease inhibitor 11
2 NM_011453			
2 AK015592	223254	Farp1	JC5795 COEP protein - human (91% human)
2 BC004009	114304	Sic28a3	concentrative na+-nucleoside cotransporter mont3 cmt3 broad substrate specificity for purines and pyrimidines system cib
2 NM_022317			
2 U70139			
2 AK019985	94062	Mrp3	adult male small intestine riken cdna clone:201032016; mrp3 mitochondrial ribosomal protein l3 l3mt
2 BC011128	27028	Ermap	erythroblast membrane-associated protein
2 NM_013848			
2 NM_025463	68991		HSPC182 protein (98% Homo sapiens)
2 AK019168	18637	Pldn2	prefoldin 2 pldn2
2 NM_011070	19346	Rab6	brain cdna clone mncb-1660 rab6 member ras oncogene family unnamed protein product
2 NM_024287			
2 AK011703	54208	Ar6ip	ADP-ribosylation-like factor 6 interacting protein
2 AF223953	21953	Tnni2	fast fiber troponin I
2 NM_009405			
2 AK005581	72061		A30325 membrane alanyl aminopeptidase (EC 3.4.11.2) precursor - human 24 %
2 AK008397	12279	C9	fragment for complement component c9 c9 protein
2 NM_013485	19298	Pxf	10 11 days embryo riken cdna clone:2810021m01; peroxisomal larnesylated protein pxf
2 NM_023041	74182		RIKEN cDNA 2310032D16 gene
2 AK009563			
2 NM_009791			
2 AF179996	13480	Dpm1	dolichol-phosphate (beta-D) mannosyltransferase 1
2 NM_010072			
2 NM_009383	72154		RIKEN cDNA 2610020C11 gene
2 AK011480			
2 AK010547			
2 NM_033616			
2 AK007113	18213	Ntk3	neurotrophic tyrosine kinase, receptor, type 3
2 NM_008746			
2 AK018335			
2 AK015480			

FIGURE 22-4

cluster analysis I
lung cancer
hypothalamus

Cluster Access	Locus	Gene	Description
2 NM_011521	20971	S0C4	syndecan 4 clone mqc.11456; ryudocan core protein
2 AK020444	77254		RIKEN cDNA 9430029K10 gene
3 AK005954	71846		RIKEN cDNA 1700013H19 gene
3 NM_010157	13983	Est2	estrogen receptor beta esrb; erb2; esr2
3 NM_021475			
3 NM_019569			
3 AK015166	74902		plac1.1, intermediate filament binding protein, 500kD [Homo sapiens] 25.74 %
3 AK015391	73332		RIKEN cDNA 1700041C02 gene
3 NM_008716	18131	Notch3	Notch gene homolog 3 [Drosophila]
3 AK018929	78283		ref:NP_116187.1 - hypothetical protein FLJ14503 [Homo sapiens] 71.76 %
3 NM_008393	16373	Trx3	iroquins homeobox protein 3
3 BC004690			
3 AK007368			
3 L25890			
3 NM_021302	57740	Pke	PKE protein kinase, hypothetical serine/threonine protein kinase [Mus musculus] 100 %
3 AK014128	207615		T46442 hypothetical protein DKFZp434F2427.1 - (96.57% human)
3 AK005939			
3 NM_018788	54616	Exi3	exostosins (multiple)-like 3
3 NM_025383			
3 NM_023371			
3 NM_023805			
3 AK006268			
3 AK009137	74182		RIKEN cDNA 2310032D18 gene
3 NM_007864			
3 AK006503	76426		chromosome 20 open reading frame 107; similar to neuronal thread protein [Homo sapiens] 60 %
3 AK003575			
3 AK017115	74476		RIKEN cDNA 5730493B19 [62.07% Mus musculus]
3 NM_011168			
3 BC006075			
3 AK011256	67896	Ssg1	steroid sensitive gene 1
3 AK005560			
3 AF206075	81896	Wdr10	WD repeat domain 10
3 BC004674			
3 NM_013483	11605	Gla	galactosidase, alpha
3 AK005536	67883	Uxs1	UDP-glucuronate decarboxylase 1
3 NM_011293	20022	Rpo2-4	rna polymerase ii 4 14 kda subunit rpo2-4
3 NM_025419			
3 AK015936			
3 NM_026095	67332	Snrpd3	small nuclear ribonucleoprotein D3
3 AK015921	75209		A43344 synaptic vesicle protein SV2 (58% rat)
3 NM_025829			
3 NM_016813	53319	Nx11	nuclear rna export factor
3 NM_008548	17155	Man1a	mannosidase alpha man1a
3 AJ307870	117224		KIAA0298 hypothetical protein (human)-ribosomal protein L27a-suppression of tumorigenicity 5
3 BC003209			
3 NM_010484	15567	Slc6a4	serotonin transporter ser1 neurotransmitter; encoding serotonin
3 NM_008078			
3 NM_008027			
3 AF090691	13012	Csl8	cystatin 8 (cystatin-related epididymal spermatogenic)
3 AK013874			
3 NM_009001	19339	Rab3a	rab3a member ras oncogene family
3 NM_013746			
3 NM_008377			
3 NM_025459			
3 NM_025677			
3 NM_007977			
3 NM_008992	66637		cDNA 573044BL18 [Mus musculus]
3 AK012967	19300	Abcd4	atp-binding cassette sub-family d ald member 4 abcd4
	76553		ENC1_MOUSE Ectoderm-neural cortex-1 protein (ENC-1) 80 % /

FIGURE 22-5

Cluster	Access	Locus	Gene	Description
3	AK009683			
3	NM_010178			
3	NM_009272			
3	NM_009045	19697	Rela	nuclear transcription factor rela p65; n-kappa-b
3	BC003470	85031	Plata	phospholipase A1 member A
3	NM_053252			
3	NM_025327	66059		18 days embryo riken cdna clone:1110002k21
3	NM_026330	67711		RIKEN cDNA 2510027N19 [Mus musculus]
3	NM_018709			
3	AK005056			
3	AF145716			
3	NM_010728			
3	BC004012	11921	Alah1	math-1 protein
3	NM_007500	20520	Slc22a5	organic cation/carnitine transporter ocln2
3	NM_027244	71912		
3	NM_011396	81898	Sl3b1	splicing factor 3b subunit 155 kda sfb1
3	AK009578	76646		adult male testis riken cdna clone:1700123d08
3	NM_031179			
3	AK007246			
3	AK006481	13383	Dlgh1	discs, large homolog 1 (Drosophila)
3	NM_007862	29865	Calp5	calcium binding protein 5
3	NM_013877	76954		JC4343 uridine phosphorylase (EC 2.4.2.3) - human 66.09 %
3	AK007264	20811	Srms	src-related kinase lacking C-terminal regulatory tyrosine and N-terminal myristylation sites
3	AL450341	66528		RIKEN cDNA Z210012G02 [Mus musculus] 100 %
3	NM_025617			
3	NM_023908			
3	AK017686	70567		RIKEN cDNA 6730455O13 gene
3	NM_008656	17877	Myf5	myogenic factor 5
3	AK021152			
3	AK002703			
3	NM_018993	56752	Alah9a1	aldehyde dehydrogenase 9a aldh9a1
3	AF281045	24014	Rnasel	2-5A-dependent RNase
3	AK004878			
3	NM_008904	19017	Ppargc1	peroxisome proliferative activated receptor, gamma, coactivator 1
3	BC003885			
3	NM_009783			
3	NM_021380	58181	Il20	interleukin 20 il20
3	BC004632			
3	NM_007597	12330	Canx	calnexin
3	AK003782			
3	NM_008191			
3	NM_016703	109889	Zip98	zinc finger protein 121 zip121
3	NM_016759	51799	Rap2ip	Rap2 interacting protein
3	BC002151			
3	AK005250	71803	Slc25a18	adult male cerebellum riken cdna clone:1500015i14
3	NM_016785	56194	Frbp3	formin binding protein 3, formin binding protein 11
3	NM_053118	93746	Gprc5d	orphan g-protein coupled receptor gprc5d
3	NM_010950	18223	Numbi	numb-like numb1
3	NM_023721	73834	alpbv1d	ATPase, H+ transporting, V1 subunit D
3	NM_023565			
3	AK007787			
3	BC002094	12913	Creb3	camresponsive element binding protein 3 clone mgc.8348; lzfp-1 and lzfp-2 proteins Send
3	NM_008842	18712	Pim1	proviral integration site 1
3	NM_025425	66211	Rpl3l	ribosomal protein L3-like
3	NM_008478	16768	Lap3	lymphocyte-activation gene 3
3	X69942	13990	Erl1	enhancer trap locus 1
3	Y07611	20875	Ptk1c1-Ptpei	protein kinase C-like 1 - prostaglandin E receptor 1 (subtype EP1)
3	AK012240			

FIGURE 22-6

cluster analysis I
lung cancer
hypothalamus

Cluster Access	Locus	Gene	Description
3 AB047323			Mus musculus gene for Cox17p, complete cds
3 NM_008916			
3 NM_007610	12366	Casp2	caspase 2 casp2
3 NM_011483			
3 NM_009573	22771	Zic1	zinc finger protein of the cerebellum zic1
3 NM_020585	57437		HSPC041 protein [85% Homo sapiens]
3 NM_008556	18611	Pea15	phosphoprotein enriched in astrocytes 15
3 AK010939			
3 AK008493			urate oxidase ec 1.7.3.3
3 NM_009474	22262	Uox	RIKEN cDNA 1110033009 gene
3 AK004078	68695		
3 AK004627			
3 NM_008834			
3 NM_017463	18515	Pbx2	pre b-cell leukemia transcription factor 2 pbx2
3 NM_010134	13799	En2	engrailed 2
3 M14872	14714	Gnrh	gnrh-gap encoding gonadotropin-releasing hormone and gn-rh-associated peptide gap precursor
3 U22015			
3 AK018458	71519	Cyp2u1	cytochrome P450, family 2, subfamily u, polypeptide
3 NM_007788			
3 NM_020269	16513	Kcnj10	atp-dependent inward rectifier potassium channel kir4.1
3 NM_025989			
3 AK021330			
3 NM_025436			
3 AK015144	73862		RIKEN cDNA 4830415F15 gene
3 NM_020621			
3 AF322375			
3 AK011967	67168	P2y5	purinergic receptor (family A group 5)
3 AK012969			
3 NM_025863	66949		RIKEN cDNA 2310035M22 [Mus musculus]
3 NM_030560	80744		
3 L35549	unknown		Mus musculus Y-box binding protein (oxyR) mRNA
3 NM_019639	22190	Ubc	ubiquitin C
3 NM_009890	12642	Ch25h	cholesterol 25-hydroxylase
3 AK018560	67556	pigm	phosphatidylinositol glycan, class m, ref:NP_077058.1 - PIG-M mRNA for mannosyltransferase [Rattus norvegicus] 98 %
3 Y17793			
3 NM_020493			
3 NM_010908			
3 NM_015749			
3 NM_013881			
3 AK015789	75064	Crbp2	cellular nucleic acid binding protein 2
3 NM_010895	18013	Neurod2	neurogenic differentiation 2 neurod2; bhlh protein
3 AK004355	67236		HeLa cyclin-dependent kinase 2 interacting protein (77% human)
3 NM_011404	20539	Sic7a5	solute carrier family 16 (monocarboxylic acid transporters), member 7
3 NM_008064	14387	Gaa	lysosomal alpha-glucosidase
3 BC005782			
3 NM_026040			
3 NM_008283	15456	Hpvc2	q300 q300 protein aa 1-77
3 AK009154	74178		Similar to G-protein-coupled receptor induced protein [40% Homo sapiens]
3 BC005581			
3 AK020053			
3 BC003988	83486	Rhm5	RNA binding motif protein 5
3 NM_008736	18185	Nrl	neural retina leucine zipper gene
3 NM_025387	66154		hypothetical protein HSPC194 [Homo sapiens] 85 %
3 NM_009469			
3 BC005753	210148	Sic30a6	solute carrier family 30 (zinc transporter), member 6
3 NM_008341	16006	Igfbp1	insulin-like growth factor binding protein-1
3 NM_011588	21849	Tian28	transcriptional intermediary factor beta itf1b; itf1 protein
3 NM_009498	22319	Vamp3	vesicle-associated membrane protein cellubrevin vampsynaptobrevin homolog

FIGURE 22-7

cluster analysis 1
lung cancer
hypohalampus

Cluster Access	Locus	Gene	Description
4 AK0129311	16582	Kifc3	kinesin family member c3 clone image:3590983; kifc3
4 NM_010631	97988	R75183	expressed sequence R75183
4 BC004774	72017	Cy65r1	cytochrome b5 reductase 1 (BSR.1)
4 AK005159			
4 NM_008040			
4 AK003371	72119		Similar to DIL2_HUMAN Resiniferatoxin expression proliferation associated protein [78% Human]
4 AK011311			
4 NM_019692			
4 NM_020619	57377	Gcs1	glucosidase 1
4 NM_010476	15490	Hsd17b7	hydroxysteroid 17-beta dehydrogenase hsd17b7
4 AK019470			
4 AK015845	22788	Zp3	zona pellucida glycoprotein 3
4 NM_011776	217449		CGI-57 protein (94% human)
4 BC002235			
4 BC002277			
4 NM_020611	57357	Srd5a2l	teroid 5 alpha-reductase 2-like; HSAR gene; steroid 5 alpha-reductase 2 like [Mus musculus] 100 %
4 AK020306			
4 U39940			
4 NM_013712	26549	Ilgfbp2	Integrin beta 1 binding protein 2
4 AF045766	14762	Gpr33	orphan g protein-coupled receptor gpr33 related to chemotractant receptors
4 NM_007819	13113	Cyp3a13	cytochrome p450 steroid inducible 3a13 cyp3a13
4 AK011496			
4 NM_007772	110521	Hivp1	encoding zinc finger protein alphaa-cybp1 partial; crystallin alpha binding cryabp1
4 NM_021471			
4 NM_017477			
4 NM_025964			
4 AF282301	258498	MOR224-4	olfactory receptor MOR224-4
4 NM_016830	54447	Asah2	N-acetylsphingosine amidohydrolase 2
4 AK006972			
4 NM_007754	12874	Cpd	carboxypeptidase d cpd
4 NM_010302	14673	Gna12	guanine nucleotide binding protein, alpha 12
4 AK018042			
4 AK014534	70802		DM3A_MOUSE DNA (cytosine-5)-methyltransferase 3A (Dnm3a) (DNA methyltransferase Mmullia) (DNA MTase 30 %
4 AK019886			
4 AK007377			
4 NM_026407			
4 NM_007655	12518	Igf	b cell mb-1
4 NM_009768	12345	Cappb1	capping protein actin filament muscle z-line beta clone mgc:6082
4 NM_025821	52502		DNA segment, Chr 16, ERATO Del 465, expressed
4 AK002574	68348		A112_MOUSE Alpha-1-antitrypsin 1-2 precursor (Serine protease inhibitor 1-2) (Alpha-1 protease inhib 35 %
4 AK005197	67703		nephin 1; nephin 1 [Mus musculus] 51 %
4 NM_010925	18114	Nnp1	novel nuclear protein nnp1
4 AJ293626	17879	Myn1	partial myosin heavy chain ix myhc-lix
4 NM_007669	12575	Cdkn1a	cyclin-dependent kinase inhibitor 1a p21 cdkn1a
4 NM_026174	67484	Lysal1	adult male lung riken cdna clone:1200014722
4 NM_033601	12051	Bcd3	B-cell leukemia/lymphoma 3 [Mus musculus] 100 %
4 NM_025555			
4 NM_011881	24013	Rhodk	rhodopsin kinase
4 BC005711			
4 AK018146	17344	Miz1	Miz-interacting-zinc finger
4 NM_026572	68133		16 days embryo riken cdna clone:1110018116; 5730591c18 5730591c18nk
4 BC004766			
4 AK010836			
4 NM_013709	24057	Sh3yl1	Sh3 domain YSC-like 1
4 NM_013792	18643	Pin1	profilin 1
4 NM_011072			
4 NM_023500	71887	Ppp2c2	protein phosphatase 2a, catalytic subunit, zeta isoform
4 AK009235			

FIGURE 22-8

Cluster	Access	Locus	Gene	Description
4	NM_013843	24132	Zfp118	zinc finger protein 118
4	M19413			
4	NM_010773	17191	Mbd2	methyl-cpg binding protein mbd2 contains repetitive sequence derived from cpg island translation
4	AK003581			
4	NM_025540	68402	Slm	sarcolipin
4	BC005609			
4	NM_010708	16859	Lgals9	lectin, galactose binding, soluble 9
4	NM_011598	21884	Fabp9	perforatoral protein perf 15 lipid binding homolog cytoskeletal component with possible membrane role; riken cdna 1700007p10rit
4	NM_014193	12292	Cacna1s	calcium channel, voltage-dependent, L type, alpha 1S subunit
4	AK004474	68888		C11P_HUMAN CA11 protein 31 %
4	NM_021312	57750	Wdr12	wd repeat domain 12 clone mgc:7936; nuclear protein ylm1p
4	BC004085			
4	AK010336			
4	NM_011623	21973	Top2a	topoisomerase dna ii alpha top2a
4	NM_030248			
4	NM_008142	14688	Gnb1	guanine nucleotide binding protein beta gnb1
4	AK015181			
4	NM_011141	18991	Pou3f1	pou domain class 3 transcription factor pou3f1; oct-6 octamer binding protein
4	AK016149			
4	NM_011990	28570	Slc7a11	solute carrier family 7 cationic amino acid transporter y+ system member slc7a11
4	AK005146	76499	Clasp2	CLIP associating protein 2
4	AK012212	107581	Col18a1	11 days embryo riken cdna clone:2700007f12
4	AK012666	69833		RIKEN cDNA 2810004A10 gene
4	NM_019410	18645	Pfn2	profilin 2
4	NM_009501	22326	Vax1	ventral anterior homeobox-containing gene 1
4	NM_007817	13107	Cyp2f2	cytochrome p-450 naphthalene hydroxylase
4	NM_026087	67315	Cesam12	CEA-related cell adhesion molecule 12 -RIKEN cDNA 1600031J20; Cesam12-C1; Cesam12-C3 [Mus musculus] 100 %
5	BC008225			
5	AK003742			
5	AB044335	75870	Tcam1	testicular cell adhesion molecule 1
5	NM_016873			
5	NM_011917	24128	Xm2	5-3 exoribonuclease 2
5	AB041350	12830	Col4a5	col4a5 type iv collagen alpha-chain
5	NM_013597	17258	Mef2a	myocyte enhancer factor 2a mef2a
5	NM_010919	18088	Nkx2-2	nk2 transcription factor related locus 2 drosophila nkx2-2
5	NM_011031	18452	P4ha2	procollagen-proline 2-oxoglutarate 4-dioxygenase proline 4-hydroxylase alpha ii polypeptide p4ha2
5	AK016718	71062		RIKEN cDNA 4933407G07 gene
5	AB030912	55992	Trim3	ring finger protein hsc1 co-activator with ringfinger motif; tripartite motif trim3
5	BC004739	213211	Rnf26	ring finger protein 26
5	NM_018749			
5	BC003908	55844	Erf3s7	eukaryotic translation initiation factor 3, subunit 7 (zebra)
5	AK020790	77782	Polq	CMG2_HUMAN Capillary morphogenesis protein-2 precursor (CMG-2) 85
5	NM_019753	12557	Cdh17	polymyrase (DNA directed), theta
5	NM_007846	13861	Epx	CADH_MOUSE Cadherin-17 precursor (Liver-Intestine-cadherin) (L-cadherin) (BILL-cadherin) (P130) 100 %
5	NM_030880	80708	Parsin3	eosinophil peroxidase
5	NM_009621	11504	Adamts1	protein kinase C and casein kinase substrate in neurons 3
5	AK019581	78125		a disintegrin-like and metalloprotease reprolysin type with thrombospondin motif adamts1; secretory protein containing motifs putative
5	NM_026069	67281	Rp37	RIKEN cDNA 4930423F13 gene
5	NM_013867			ribosomal protein L37
5	NM_010836	17703	Msx3	msx3 the drosophila melanogaster muscle segment homeobox msh protein encoded by genbank accession number u33319
5	NM_007667	12564	Cdh8	cadherin-8
5	NM_012045			
5	NM_015809			
5	NM_009575	22773	Zic3	zic3 protein
5	AK002465			
5	NM_029509	76074		RIKEN cDNA 5830443L24 gene
5	AK007298	76999		KLK9_MOUSE Glandular kallikrein K9 precursor (Tissue kallikrein) (MGK-9) (Epidermal growth factor-bi 66 %
5	NM_031873	83770	Tas1i2	candidate taste receptor t1i2 g protein coupled

FIGURE 22-9

cluster analysis I
lung cancer
hypothalamus

Cluster Access	Locus	Gene	Description
5 BC005709	229487	Pet1121	PET112-like (yeast)
5 AK015703	75039		RIKEN cDNA 4930505H01 gene
5 AK015509	74901		RIKEN cDNA 4830465M17 gene
5 AK011541			
5 NM_017378	53601	Pcdh12	protocadherin 12 pcdh12
5 NM_010218			
5 AK009163	78730		RIKEN cDNA 2310005C01 gene
5 NM_025450	66258	Mpr17	adult male tongue riken cdna clone:23 10032709
5 NM_008378	21824	Thbd	thrombomodulin
5 AK014062			
5 AK015396			
5 AJ004467	54427	Dnmt3l	DNA (cytosine-5)-methyltransferase 3-like
5 NM_018535			
5 NM_008951	69545		Similar to HUMAN Stress-induced-phosphoprotein 1 (ST11) (Hsp70/Hsp90-organizing protein) [44% Human] stip1
5 AK009368			
5 AK005680	70891		RIKEN cDNA 4921517J08 gene
5 AK016064			
5 AK011489			open reading frame 5
5 NM_016924	53858	ORF5	lipocalin 4
5 NM_010695	16821	Lcn4	guanine nucleotide binding protein alpha 13 gna13
5 NM_010303	14674	Gna13	
5 AK012571			
5 NM_025938			
5 NM_020032	56626	Poli	polymerase (DNA directed), lambda
5 BC003984			protein DKFZp56611024.1 - human (fragment) (37% human)
5 AK013017	67802		
5 AK009168	70090		hypothetical protein, MNCb-2622
5 NM_021416	58227		adult male kidney riken cdna clone:0610042h23
5 AF202272	258740	MOR171-12	activator of S phase kinase
5 NM_023612	71690	Esm1	adult male kidney riken cdna clone:0610042h23
5 NM_013726	27214	Ask	
5 AK019926			
5 NM_008608	17385	Mmp11	matrix metalloproteinase 11 mmp11
5 NM_025971	67107		RIKEN cDNA 290001A12
5 AK007603	69772		oxidoreductase UCPA [Homo sapiens] 90 %
5 AJ262072	192160	Min51	MLN51 protein
5 AK011332	70315	Hdac8	histone deacetylase 8
5 NM_008401	16409	Ilgam	integrin alpha M
5 NM_013672	20683	Sp1	trans-acting transcription factor 1
5 BC009507	70099	Smc411	SMC4 structural maintenance of chromosomes 4-like 1 (yeast)
5 NM_008759	18292	Og9x	OG9 homeobox gene
5 NM_011998	26876	Adh4	alcohol dehydrogenase 4 (class II), pl polypeptide
5 NM_013603	17751	M13	metallothionein 3
5 AB044560			
5 NM_011845	23947	Mld2	mdln2 2
5 NM_019702	56422	Hbs11	Hbs1-like (S. cerevisiae)
5 NM_029269	75396		Secreted phosphoprotein 24 precursor (Spp-24) (Secreted phosphoprotein 2) (68% human)
5 AK002734	74091	Npl	N-acetylneuraminidase pyruvate lyase
5 NM_020012	56736	Rnf14	10 days embryo riken cdna clone:2610005d23, rnf2 type 1 ara54
5 AK006831			Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700058G18 product:hypothetical protein
5 AK018130	70719		PTPL1-associated RhoGAP 1 [Homo sapiens] 34 79 %
5 AK016814	75727		RIKEN cDNA 4933415A04 gene
5 NM_019510			
5 AK019713	78920		riken cdna 4930528o08 clone mgc:7835
5 NM_018783	54723	Tip39	tuffelin-interacting protein 39 tip39
5 AK003685	68501		product:hypothetical Modified RING finger domain containing protein
5 NM_009252			

FIGURE 22-10

Cluster Access	Locus	Gene	Description
5 AK006318	80297	Spnb4	spectrin beta 4
5 AY032655	77125		DVS27-related protein [Homo sapiens] 51 %
5 BC003847	26377	Dapp1	dual adaptor for phosphotyrosine and 3-phosphoinositides 1
5 NM_011832	26146	D3Uct1	DNA segment, Chr 3, University of California at Los Angeles 1
5 NM_030685	26443	Pma6	proteasome protease macropain subunit alpha type 6
5 NM_011968	20220	Sap18	sin3-associated polypeptide 18 sap18
5 NM_009119	19674	Rcvm	rescovein
5 NM_009038	70859		RIKEN cDNA 4921509B22 gene
5 AK014850	70891		RIKEN cDNA 4921517J08 gene
5 AK014910	69329		hras suppressor expressed in skeletal muscle heart brain and bone marrow; 18 days embryo riken cdna clone:1190010123
5 NM_013751	27281	Hras1s	forkhead transcription factor foxe3 foxe3/foxc8/fkh12
5 NM_015758	30923	Foxo3	
5 AK017667			
5 NM_026024	56613	Rps6ka4	ribosomal protein S6 kinase
5 NM_018924	18420	Oip	orthopedia homolog drosophila oip
5 NM_011021	101502	Hsd3b7	hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase 7
5 AF277718	74748		B lymphocyte activator macrophage expressed; BCM-like membrane protein (75% human)
5 AK017911	101661		hypothetical protein MGC16733 (88% human)
5 BC013813	16875	Krt1-c29	keratin complex-1 c29 krt1-c29
5 NM_010668	67336		fling [Homo sapiens] 83 %
5 NM_026097			
6 NM_019933			
6 AK012087			
6 AK020377	54393	Gabbri1-Ubc	gamma-aminobutyric acid (GABA-B) receptor, 1-ubiquitin D
6 AL078630	70088		Similar to hypothetical protein FLJ11730 [87% Homo sapiens]
6 AK009177	18263	Odc	ornithine decarboxylase, structural
6 NM_013614			
6 NM_009539	60371		adult male testis riken cdna clone:1700022a16
6 AK006257			
6 U09638	16133	Rds	retinal degeneration, slow (retinitis pigmentosa 7)
6 NM_008938	268930	Pkmy1	membrane-associated tyrosine- and threonine-specific cdc2-inhibitory kinase
6 NM_023058	50501	Prok2	secretory protein b78
6 NM_015768	109791	Clps	colipase, pancreatic
6 NM_025469	26559	Hunk	hormonally upregulated Neu-associated kinase
6 NM_013755	26563	Ror1	receptor tyrosine kinase-like orphan ror1 - ROR1
6 NM_013845	12905	Cradl	CASP2 and RIPK1 domain containing adaptor with death domain
6 NM_009950	66493	Mip51	mitochondrial ribosomal protein L51
6 NM_025595	23963	Ox51	odd Ozfien-m homolog 1 (Drosophila)
6 NM_011855			
6 NM_009508	76267		fatty acid desaturase 1; delta-5 fatty acid desaturase; linoleoyl-CoA desaturase (delta-6-desaturase)
6 AK002976			
6 AK009532			
6 AF217002			
6 BC010476	72244		T47169 hypothetical protein DKFp762D096.1 - human (fragment) 82 %
6 NM_030612	80859	Mail	molecule possessing ankyrin-repeats induced by lipopolysaccharide mail
6 AK020378	77225		Mus musculus adult male diencephalon cDNA, RIKEN full-length enriched library, clone:9330161L09 product: hypothetical protein
6 AK006002	69401		protein related with psoriasis (46% human)
6 NM_008799	18567	Pcdc2	programmed cell death 2 pcdc2
6 AK017451	71452		RIKEN cDNA 5530600A18 gene
6 NM_018716	56452	Orc6	origin recognition complex subunit orc6
6 AK016041			
6 NM_013456	11474	Actn3	actinin alpha 3
6 NM_008004	14171	Fg117	fibroblast growth factor 17
6 NM_011127	18933	Prrx1	paired related homeobox 1
6 AK015947	68195		ribonuclease 6 precursor [Homo sapiens] 67 %
6 NM_025703	66684		pp21 homolog [Homo sapiens] 36 %
6 NM_008190	15159	Hccs	Holocytochrome c synthetase

FIGURE 22-11

Cluster	Access	Locus	Gene	Description
6	NM_008405	16415	Ilgb2l	Integrin beta 2-like ilgb2l
6	NM_007548	12142	Ptdm1	pr domain containing with znt prdm1
6	NM_028188			
6	AK014048			
6	U62907	22757	Zfp95	zinc finger protein 95 zfp95
6	NM_028170	67458		hypothetical 43.2 Kd protein [45% Homo sapiens]
6	NM_021563	59078	Erbp2ip	erbp2-interacting protein erbin basolateral
6	AK013485			
6	NM_030744	76378	Rppn	roporin loc81026
6	AJ250890			Mus musculus partial mRNA for sr104 protein
6	NM_011322	20266	Scn1b	sodium channel voltage-gated type I beta polypeptide scn1b; beta-1 subunit
6	NM_025661	66612	Ormdl3	ORM1-like 3 (S. cerevisiae)
6	AK005325			
6	AK017836	78742		SNX14_HUMAN Sorting nexin 17 (25% human)
6	NM_010867	17993	Ndufs4	nadh dehydrogenase ubiquinone fe-s protein 4 18 kda ndufs4; 13 days embryo liver riken cdna clone:2510049a12
6	NM_023243	66671	Ccnh	cyclin h ccnh regulatory subunit of cdk7 partner cdk7 in cak and lfth
6	NM_021500			
7	NM_020597	17695	Mamb	beta-microseminoprotein; beta-inhibin; prostatic inhibin protein [Mus musculus]
7	AK017032			
7	AK004111			
7	AK003853	56470	Rgs18lp1	riken cdna 2610042604 clone mgs:6350; 2610042604rik
7	NM_028446			
7	NM_025880			
7	AK015740	23780	Coro1c	coronin-3
7	NM_011778			
7	NM_008083			
7	NM_011861			
7	AK018309			
7	AK015939			
7	AK013995	73078		days embryo head riken cdna clone:3110004o18
7	NM_018779			
7	NM_016873	22403	Wisp2	WNT1 inducible signaling pathway protein 2
7	NM_026015			
7	NM_011178			
7	NM_007750	12868	Cox8a	adult male kidney riken cdna clone:0610011c24
7	NM_008298	15502	DnaJ1	DnaJ (Hsp40) homolog, subfamily A, member 1
7	AK005765			
7	NM_008830	18870	Abcb4	ATP-binding cassette, sub-family B (MDR/TAP), member 4
7	AK002512	60600		putative nuclear protein ORF1-FL49 [Homo sapiens] 89.42
7	AK013082			
7	NM_028333			
7	AK003744			
7	NM_021328			
7	NM_010241			
7	NM_016744			
7	NM_008703			
7	NM_025331			
7	AK006258	18101	Nmbr	neuromedin B receptor
7	NM_008549			
7	AK009020	17158	Man2a1	mannosidase 2 alpha man2a1
7	AK016310			
7	AK003232	15269	His14	adult male testis riken cdna clone:4930578o05
7	AK005136	108857	Cbr3	carbonyl reductase 3
7	AK004989	66112		adult male liver riken cdna clone:1300013115
7	NM_007780	12983	Cs12rb1	interleukin receptor-like protein aic2b precursor
7	NM_009320	21366	Sic6a6	solute carrier family 6 neurotransmitter transporter taurine member sic6a6; mus cookii taurine/beta-alanine
7	AK008209	72064		RIKEN cDNA 2010012G17 gene
7	NM_028279	72560	Naaad2	N-acetylated alpha-linked acidic dipeptidase 2

FIGURE 22-12

cluster analysis I
lung cancer
hypothalamus

Cluster Access	Locus	Gene	Description
7 NM_025675			
7 AK017880			
7 NM_013762	27387	Rp3	j1 protein yeast ribosomal l3 homologue
7 AK014606			
7 AK019752			
7 NM_023128	18483	Palm	paralemin Mus musculus] 100 %
7 NM_025708	66690		days embryo liver riken cdna clone:4432406c05
7 NM_007706			
7 NM_021313			
7 NM_022020			
7 BC005696			
7 AK014276	71818		RIKEN cDNA 3200001D21 gene
7 AK006986	76618		RIKEN cDNA 1700084C06 gene
7 NM_008559	17199	Mc1r	melanocortin 1 receptor
7 NM_019769			
7 BC003288			
7 NM_010412	15184	Hdac5	histone deacetylase 5 hdac5 class ii
7 AK007351	69038		chromosome 11 open reading frame 10 [Homo sapiens] 100 %
7 NM_008351			
7 NM_013588			
7 NM_021329	57785	Rangrf	ran guanine nucleotide release factor rangrf; es cells riken cdna clone:2400006h24
7 BC003237	96985		CFP1_HUMAN Pre-mRNA cleavage complex II protein Cfp1 (98% human)
7 AK006118	71860		RIKEN cDNA 1700018F09 gene
7 NM_029838			
7 AK007452			
7 NM_009828			
7 AK007659	69156		RIKEN cDNA 1810030M08 gene
7 NM_028629	68235		RIKEN cDNA 2410066E13 gene
7 NM_008106	14539	Opn1mw	opsin 1 (cone pigments), medium-wave-sensitive (color blindness, deutan)
7 NM_031168	16533	Kcnmb1	potassium large conductance calcium-activated channel subfamily beta member kcnmb1; calcium activated subunit
7 AK013503			
7 AK009218			
7 AK009460			
7 AK005748	69351		RIKEN cDNA 1700008A04 gene
7 NM_016855			
7 AF155352			
7 AK007598			
7 NM_009789	12346	Carl	carbonic anhydrase 1
7 NM_017476	54194	Nakap95	neighbor of a-kinase anchoring protein 95 nakap95; 10 days embryo riken cdna clone:2610005I22
7 AK003928	68530		RIKEN cDNA 1110019L22 gene
7 NM_026331			
7 AK020595			
7 NM_009004	19348	Rab6l1	rab6l1
7 AK003912	77037		RIKEN cDNA 1110025G12 gene
7 NM_008897			
7 NM_008230			
7 NM_023844			
7 AK004506	68942		T12468 hypothetical protein DKFZp564O123.1 - human 97 %
7 NM_025460			
7 NM_008821	18630	Pe12	plasmacytoma expressed transcript 2
7 NM_008980	19262	Pipa	leukocyte common antigen-related phosphatase precursor
7 NM_026580	68149		ubiquitin-specific protease olubain 2 (94%)
7 NM_010867	17929	Myom1	myomesin/skelatin
7 L20343	12296	Cacnb2	calcium channel, voltage-dependent, beta 2 subunit
7 NM_026216	67528		RIKEN cDNA 1500031J01 gene
7 NM_008814	18609	Pdx1	pancreatic and duodenal homeobox pdx1
7 U62608	22758	Zfp96	zinc finger protein 96 zfp96
7 NM_009530	22589	Xnp	atrx protein putative atpase and helicase

FIGURE 22-13

cluster analysis of
lung cancer
hypothalamus

Cluster Access	Locus	Gene	Description
7 AK007258	Unknown		adult male testis riken cdna clone:1700123m18
7 NM_013593			
7 NM_031374			
7 AK018179	104271	Tex15	testis expressed gene 15: 2210014E14Rik [Mus musculus] 100 %
7 NM_053258			
7 BC002251			
7 AB035381			
7 NM_008525	17025	Alad	aminolevulinatase, delta-, dehydratase
7 NM_016923	17087	Ly96	esop1 cytokine secreted protein
7 NM_025504	66349		RIKEN cDNA 2310004L02 gene
7 NM_007904	13818	Ednrb	endothelin-b receptor ednrb
7 NM_011316	20211	Saa4	serum amyloid a saa4 pseudogeneand saa5
7 NM_011991	26572	Cops3	COP9 (constitutive photomorphogenic) homolog, subunit 3 (Arabidopsis thaliana)
7 NM_009287	20866	Slim1	stromal interaction molecule slim1
7 AK008402			
7 NM_013896			
7 NM_008408	16430	Itim1	integral membrane protein itim1
7 NM_016878	13437	Dnpep	aspartyl aminopeptidase
7 AB048834	64435	Fcgr1r	Fc receptor, IgA, IgM, high affinity
7 NM_013782			
7 NM_009324	21385	Tbx2	I-box Ibx2
7 U56888	13733	Enr1	enr1 a seven transmembrane hormone receptor that contains egr-like motifs
7 AK013595	72871		Mus musculus adult male hippocampus cDNA, RIKEN full-length enriched library, clone:2800024P18 product:hypothetical Profilin/allergen containing protein
7 AF285091	68659		AD021 protein (88% human)
7 NM_009860	12532	Cdc25c	cell division cycle 25 homolog c s. Cerevisiae
7 NM_016960	20297	Scya20	macrophage inflammatory protein 3 alpha cc chemokine mip-3; larc
7 NM_007733	12823	Col19a1	adult male testis riken cdna clone:4931426b13 full insert sequence; collagen a1 xix chain
7 AK005253			
7 NM_013470			
7 NM_021437			
7 AK002441	66039		hypothetical protein FLJ13263(71% human)
7 NM_031999	83924	Tm7sf11	transmembrane 7 superfamily member upregulated in kidney clone mgc:7085; tm7sf11
7 AK016603			
7 AB047820			
7 NM_019983			
7 BC005755			
7 NM_009962	14764	Gpr44	putative g-protein coupled receptor orh2
7 NM_008364	16180	Il1rap	interleukin 1 receptor accessory protein
7 AK005049			
7 NM_025400			
7 NM_025295			
7 NM_019727	56440	Snx1	msnx1 sorting nexin; snx1
7 NM_026401			
7 V007111			
7 AK014639			
7 AK002788			
7 BC005603	68776	Taf11	TAF11 RNA polymerase II, TATA box binding protein (TBP)-associated factor
7 NM_007440			
7 X76011			
7 NM_019802	56316	Ggcr	gamma-glutamyl carboxylase
7 BC019215			
7 NM_011202			
7 NM_008260			
7 NM_008593	15377	Foxo3	forkhead box o3 foxo3
8 NM_008233			
8 NM_025283			
8 NM_008136			
8 NM_021704	20315	Cxcl12	chemokine (C-X-C motif) ligand 12, l81182 cytokine - mouse 100 %

FIGURE 22-14

Cluster Access	Locus	Gene	Description
8 NM_028543	71673		g1-related zinc finger protein [51% Mus musculus]
8 NM_013773	77080		Mus musculus adult male epididymis cDNA, RIKEN full-length enriched library, clone:9230110F15 product:hypothetical protein
8 NM_018883			
8 AK002414			interferon gamma receptor 2
8 AK020329	15980	Itfgr2	
8 AJ223472			fizzled homolog 3 drosophila fzcd3
8 NM_008339	14365	Fzd3	
8 NM_025294			
8 NM_021458			
8 X95226			
8 AK012385	73001		RIKEN cDNA 2800055J20 gene
8 AK013700			
8 AK003377			
8 NM_010883	17986	Ndph	
8 AK005072	52870		Notre disease homolog
8 BC004642			cleavage and polyadenylation specific factor 4, 30kD subunit; cleavage-polyadenylation specificity (60% human)
8 AK018849			
8 NM_019985	58760	Clec2	10 day old male pancreas riken cDNA clone:1810061113, c-type lectin-like receptor 2 clec2
8 AK003871			
8 NM_007711	12725	Clec3	chloride channel protein clec3
8 NM_019710	24061	Smc111	SMC (structural maintenance of chromosomes 1)
8 NM_053186			
8 AK002882	74094		light junction protein 4 (peripheral); hypothetical gene supported by AK024269; AL117398; protein (85% human)
8 NM_013553	15423	Hoxc4	hox 3 cluster: hox3.5 homeobox homeobox; homeo box c4 hoxc4
8 NM_009194	20496	Sic12a2	solute carrier family 12 member 2 sic12a2
8 AK003534	71787		IRNA selenocysteine associated protein [Homo sapiens] 98.64 %
8 NM_007851			
8 AK004795	67387	Erip29	10 11 days embryo riken cDNA clone:2810446m09; adult male lung clone:1200015m03
8 NM_019959			
8 NM_019744	27057	Nco34	nuclear receptor coactivator 4
8 AK014671	74603		antigen identified by monoclonal antibody MRC OX-2 receptor (41% Mus musculus)
8 NM_010918	16087	Nktr	natural killer tumor recognition sequence nktr
8 NM_018395	14121	Fbp1	fructose biphosphatase 1
8 AK021358	14683	Glycam1	mucin-like glycoprotein glycam1
8 NM_023162	66136		RIKEN cDNA 1110014N07 gene; nuclear RNA polymerase 1 small specific subunit [Mus musculus] 100 %
8 AK009207	76429		RIKEN cDNA 2310007H09 gene
8 NM_011075	18669	Abcb1b	multidrug resistant protein
8 NM_010160	14007	Cugbp2	CUG triplet repeat RNA binding protein 2
8 NM_016974	13170	Ddp	D site albumin promoter binding protein
8 NM_032418	13400	Dm15	dystrophin myotonic kinase, B15
8 NM_023290	67027	Mkn2	makorin, ring finger protein, 2; Makorin RING zinc finger protein 2 [Mus musculus]
8 NM_007874	13476	Dp1	10 11 days embryo riken cDNA clone:2810423g21; deleted in polyposis dp1
8 NM_022408	27886	Es2el	expressed sequence 2 embryonic lethal - Es2 protein; DNA segment, Chr 16, human D22S1269E, expressed [Mus musculus] 100 %
8 NM_013818	18367	Olfr66	olfactory receptor 66
8 NM_007516	11891	Hnrpd	heterogeneous nuclear ribonucleoprotein D
8 AK015283	74666		Similar to hypothetical protein MGC11271; pre-T/NK cell associated protein (3B3) [60% Homo sapiens]
8 BC010495			
8 NM_020279	56838	Scya28	small inducible cytokine a28 scya28
8 AY013759			
8 NM_021710	11782	Ap4s1	adult male cerebellum riken cDNA clone:1500019b17
8 AK010169			
8 AK005852			
8 NM_007523	12018	Bak1	bak hcd-2 family member
8 AK009092	71883		RIKEN cDNA 2310002F18 gene
8 AK016435			
8 L31783			
8 AK019849			
8 NM_009368	21807	Tgfb14	transforming growth factor beta 1 induced transcript 4

FIGURE 22-15

Cluster Access	Locus	Gene	Description
8 NM_021394			
8 NM_013645			
8 NM_024267			
8 L04678	16417 Itgb4		integrin beta 4
8 NM_008156	14756 Gpld1		glycosylphosphatidylinositol-specific phospholipase d precursor gpld1 gpr-pd; adult male liver riken cdna clone:1300010g06
8 NM_008956	19205 Ptp1		polypyrimidine tract binding protein 1
8 AF343088			
8 NM_007729	12814 Cx11a1		a1xi collagen chain
8 NM_011492	20869 Slt11		serine/threonine kinase 11
8 NM_015760	50490 Nox4		NADPH oxidase 4
8 BC002231			
8 AF083876	13731 Emp2		epithelial membrane protein 2
8 AK004919			
8 AK015282			
8 AF348968			
8 NM_009284	20852 Stat6		stat6
8 NM_011570	21753 Tes		testis derived transcript
8 NM_026124	67388		putative Rab5-interacting protein [Homo sapiens] 88 %
8 NM_020331	57080 Gt2ird1		transcription factor ii-1 repeat domain protein gt2ird1/alternatively spliced splice variant; gt2i domain-containing gtf2ird1
8 NM_019682	56455 Dndc1		dynein, cytoplasmic, light chain 1
8 AK012102	72544 Mir3		Mir3 (mRNA transport regulator 3)-homolog (yeast)
8 AK010511			
8 NM_031173	108077 Skw2i		skw2w protein ski
9 NM_021337	12848 Cops2		alien-like protein drosophila putative thyroid receptor interacting encoded by the alien; es cells riken cdna clone:2410004e04
9 NM_009539			
9 NM_019648	16598 Klf2		lung kruppel-like factor promoter region and klf1
9 NM_008452			
9 NM_008187			
9 AK015027			
9 NM_028119			
9 AF204060	65115 Bean		brain expressed, associated with Nodda
9 NM_008040			
9 NM_019544	56184 Mgn1		pMesogenin1; mesogenin [Mus musculus] 100 %
9 D26047	18700 piga		phosphatidylinositol glycan, class A
9 NM_025910	67014 Mina		myc induced nuclear antigen
9 BC004091	215705		hypothetical protein CLONE24845 (27% human)
9 BC008549	18453 P4hb		cellular thyroid hormone binding protein p55; disulfide isomerase ep59
9 NM_009973	12992 Csnd		casein delta
9 AK018071			
9 NM_031379			
9 NM_016766	51812 Mcrs1		microspherule protein clone mpc:5852; nucleolar msp58
9 AK010544	72083		es cells riken cdna clone:2410018g20
9 AK005311			
9 NM_021524			
9 NM_031494			
9 NM_021352	12962 Crybb3		beta-b3-crystallin crybb3
9 AK014772	74592		RIKEN cDNA 48334/2610 gene
9 AK006211	67630		Ta5942 hypothetical protein F5K20.320 -(23% Arabidopsis thaliana)
9 AK006952	70770		POL2_MOUSE Retrovirus-related POL polyprotein [Contains: Reverse transcriptase; Endonuclease][32 % Mus musculus]
9 AK014334			
9 AK027262			
9 AK006830			
9 NM_019791			
9 AF242377	117063		Z208_HUMAN Zinc finger protein 208 53 %
9 NM_007923	13714 Elk4		elk4 member of ets oncogene family clone image:3589378
9 NM_016750	51788 H2atz		histone h2a.z
9 AK010430			
9 AK010472	69747		RIKEN cDNA 2410012H22 gene

FIGURE 22-16

Cluster Access	Locus	Gene	Description
9 NM_007484	16351	lpp	actin-binding protein mipp
9 AF285178	20908	Sux3	synlaxin 3a
9 AK004778	67369		hypothetical protein FLJ20084 (83% human)
9 BC017648	66695	Aspn	asporin precursor aspn preproprotein type i extracellular matrix leucine-rich repeat protein
9 NM_026111	53975	Ddx20	DEADH (Asp-Glu-Ala-AspHis) box polypeptide 20
9 AF316825	12850	Cox7	demethyl-Q 7
9 NM_017397	20997	T	brachyury
9 AF080580	56214	Scamp4	secretory carrier membrane protein 4
9 NM_008458	18598	Pdha2	adult male testis riken cdna clone:1700025113; pyruvate dehydrogenase pdha-2
9 NM_008309	12556	Cdh16	ksp-cadherin cdh16
9 NM_019575	77011		Mus musculus 8 days embryo whole body cDNA, RIKEN full-length enriched library, clone:5730590G19 product:hypothetical protein
9 NM_019547			
9 AK016979	68721		kappaB-Ras1 protein [Mus musculus] 100 %
9 NM_008811	18706	Pik3ca	phosphatidylinositol 3-kinase catalytic alpha polypeptide pik3ca
9 AK076653	67628		RIKEN cDNA 2410030K01 gene
9 AK017879	11429	Aco2	mitochondrial acetylase nuclear aco2 clone mgc:7148
9 NM_020569	27277	Golg3	golgi autoantigen, golgin subfamily a, 5 [Mus musculus] 100 %
9 NM_024185	69602		RIKEN cDNA 2310011E08 gene
9 NM_023526	23890	Gpr34	adult male corpus striatum riken cdna clone:c03000411; g protein-coupled receptor 34 gpr34
9 NM_008439	12521	Kail1	c33/2/3a4 homologue of the c33 antigen a target mabsinhibitory to hlv-1 induced syncytium formation
9 AK005610	69178	Snx5	sorting nexin 5
9 NM_024185	54667	Alpbh2	putative e1-e2 atpase transbilayer amphipath transporter class id
9 NM_023135	18777	Lypla1	lysophospholipase 1
9 NM_008866	50793	Orc3	origin of replication 3 homolog s. cerevisiae orc3
9 NM_008507	80877	Lrb3	lrb300 protein
9 NM_015824	13618	Edn3	Edn3
9 NM_030695	26464	Vnn3	vanin 3
9 NM_023908	88828	Sync	syncollin dystrobrevin binding protein
9 NM_007903	94094	Trim34	tripartite motif protein 34
9 NM_011979	26417	Mapk3	mitogen activated protein kinase 3
9 AK017269	30936	Tscot	thymic stromal co transporter
9 NM_023485	57439		RIKEN cDNA 1300007B12 gene
9 NM_010174	77749		hypothetical protein FLJ12547 (38% human)
9 NM_030684	11364	Acadm	medium-chain acyl-coa dehydrogenase acadm
9 BC013754	72747		RIKEN cDNA 4930560E09 (Mus musculus 25 %)
9 NM_021053	66091	Ndufa3	NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 3
9 NM_020588	19337	Rab33a	rab33a member of ras oncogene family
9 AK020339			
9 BC009123			
9 NM_007382			
9 AK013267			
9 AF285577			
9 NM_024281			
10 AK006243			
10 AK016916			
10 NM_011228			
10 AK019981			
10 NM_029121			

FIGURE 22-17

Cluster Access	Locus	Gene	Description
10 AK007484	24017	Rnf13	ring finger protein 13
10 NM_011883	117150	pip5k2c	phosphatidylinositol-4-phosphate 5-kinase, type II, gamma
10 NM_054097	27218	Slam	signaling lymphocyte activation molecule
10 NM_013730			
10 NM_009441			
10 AK006197	56640	Klk4	kallikrein 4 (protease, enamel matrix, prostate)
10 NM_019928	14429	Galc3	galactin receptor 3
10 NM_015738	20479	Vps4b	shd1 protein putative atpase non-sensitive fusion nsf swiss-prot accession number p18708 cd048p pir a39977 pas: vacuolar sorting 4b yeast clone mgc:6072
10 NM_009190	75875		Similar to MOUSE HOMEOBOX PROTEIN GOOSECOID-LIKE (GSC-2) [100% Mouse]
10 AK016252	70775		Similar to transcription factor ATBF1 [25% Mus musculus]
10 AK014397			
10 NM_008102	75735	Pank1	pantothenate kinase 1
10 AK019493	74198	Dtx2	10 days embryo riken cdna clone:2810524d08, dtx2
10 NM_023142	13078	Cyp1b1	cytochrome P450, family 1, subfamily b, polypeptide 1
10 NM_009994			
10 AK006287	12402	Cbl	c-cbl proto-oncogene
10 NM_007619			
10 NM_019765	16881	Lig1	ligase I, DNA, ATP-dependent
10 NM_010715			
10 D50060			
10 NM_018768			
10 AK006389			
10 NM_010202			
10 AK012109			
10 NM_016716	21898	Tlr4	tol-like receptor 4
10 AK014533	65964	Zak	mlk alpha
10 NM_023057	21428	Tcf4	transcription factor like 4 tcf4
10 NM_011550	13118	Cyp4b	cytochrome P450, family 4b, subfamily a, polypeptide 1
10 NM_010010	14179	Fgfr8	fibroblast growth factor 8
10 U18746			
10 NM_025840	26968	Isir	immunoglobulin superfamily containing leucine-rich repeat
10 NM_012043			
10 NM_025774			
10 NM_009368	57272	Ora16	gene for odorant receptor A16
10 NM_020515			
10 AK015309			
10 BC004826	17722	mt-Nd6	Mus musculus mitochondrion, complete genome
10 NC_001569	106200		Similar to PDIA3_MOUSE Protein disulfide isomerase A3 precursor (Disulfide isomerase ER-60) (ERp60) 31%
10 AK013044	75500		RIKEN cDNA 1700010H22 gene
10 AK005827	77627		RIKEN cDNA 4931407K02 gene
10 AK016516	74415		dual-specificity tyrosine-(Y)-phosphorylation regulated kinase 2 isoform 2 [99% Homo sapiens]
10 AK016565			
10 AK016531			
10 AK011832	72465	Zip131	zinc finger protein 131
10 AK015021	70954		adult male testis riken cdna clone:4922502b01
10 D13695	17082	Il1rl1	interleukin 1 receptor-like 1
10 NM_009550	22678	Zip2	zinc finger protein 2 zip2; mszl87
10 AK006571	57344	Cyt19	methyltransferase Cyt19
10 AK008440	75564		RIKEN cDNA 1700027N10 gene
10 NM_007882	13559	E2f5	e2f transcription factor 5 clone mgc:9043; e2f-5 protein
10 AK013197	66390		CGI-107 protein (95% human)
10 AK017076			
10 NM_021099	16590	Klf1	kit oncogene
10 NM_009872	11737	Anp32	cerebellar leucine rich acidic nuclear protein larp phosphoprotein 32 mpp32 encoded by genbank accession number u734; anp32
10 NM_027044			
10 AK017516			
10 NM_033623			
10 NM_009104	20135	Rim2	ribonucleotide reductase M2

FIGURE 22-18

Cluster Access	Locus	Gene	Description
10 AK016214			
10 AF398969			
10 AB008392			
10 NM_026423	15388	Hnrp1	protein l mprt: ribonucleoprotein
10 NM_017404	27393	Mrip39	10 day old male pancreas riken cdna clone:1810033d11; unknown c21or8
10 AK006786			
10 NM_019842	20014	Rpn2	ribophorin II
10 NM_016973	50935	Siat71	sialyltransferase 7 ((alpha-N-acetylneuraminyl 2,3-betagalactosyl-1,3)-N-acetyl galactosaminide alpha-2,6-sialyltransferase) F
10 NM_023284			
10 NM_010447	15382	Hnrpa1	rearranged ma binding protein flt-2
10 U62873			
10 NM_020514			
10 AK019654	78911		T08013 RING finger protein Fxy - 24%; mouse
10 NM_025301	27397	Mrip17	ribosomal protein mitochondrial l26 rpm126
10 NM_021344	57816	Tesc	testicular tesc
10 NM_015770	50518	a	nonagouti
10 NM_029826	266832	Ira1a	interleukin-1 receptor-associated kinase 4
10 AK021409			
10 AK005834			
10 NM_021387	58188		Mus musculus hypothetical protein, clone 2-45 (AB030198).
10 NM_019458	54624		hypothetical protein F23149_1(97% human)
10 U79525	14747	Cmk1r1	orphan g-protein coupled receptor dez
10 NM_011585	21677	Tead2	TEA domain family member 2
10 AK004618	74106		RIKEN cDNA 1200008M05 gene
10 BC009093			early growth response 2 clone mgc:7113; zinc finger protein krox-20 exon a
10 AK016921	13654	Egr2	
10 NM_009871			
10 AK015327			
10 AK018520	71544		GTPase regulator associated with the focal adhesion kinase pp125 [Homo sapiens] 56.19 %
10 AK019605	78799		reliculon 1; neuroendocrine-specific protein (62% human)
10 NM_011337	20302	Scya3	t-cell secreted protein ty6 sis-alpha; small inducible cytokine a3 scya3
10 BC016434	16658	Matb	transcription factor matb basic region-leucine zipper protein
10 NM_008123	14616	Gja8	gap junction membrane channel protein alpha gja8
10 AB042432			
10 NM_026405	67844		10 days embryo riken cdna clone:2810011a17
10 NM_011342	20333	Sec221	SEC22 vesicle trafficking protein-like 1 (S. cerevisiae)
10 NM_021539	59043	Wsb2	WD-40-repeat-containing protein with a SOCS box 2
11 AK008338			
11 NM_020501			
11 AK014581			
11 AK009834			
11 NM_011787	23802	Amtr	autocrine motility factor receptor clone image:3500628; amtr
11 NM_011821	23888	Gpc6	glypican 6 gpc6
11 AK015986			
11 L13204	15223	Foxj1	hnr1-3/orthodent homolog-4 hnr-4 bp 256...303 activation domain region II 508...810 winged helix dna binding
11 NM_011602	21894	Tin	Talin
11 AB016602			
11 AK014667	74577		hypothetical protein MGC10771 [78% Homo sapiens]
11 NM_028564	73534		adult male testis riken cdna clone:1700062m22
11 NM_008166	14803	Grid1	glutamate receptor ionotropic delta grid1
11 AK010153			
11 NM_010210	14198	Fhil	fragile histidine triad gene
11 NM_016972	50934	Sic7a8	glycoprotein-associated amino acid transporter lat2
11 AK013511	72900	Nduk2	NADH dehydrogenase (ubiquinone) flavoprotein 2
11 NM_007870	13421	Dnae13	dnase gamma deoxyribonuclease
11 NM_025978	67120		RIKEN cDNA 2700016E08 gene
11 NM_007880	13496	Dn1	dead finger homolog 1 (Drosophila)
11 NM_020483	57230	Hcngp	11 days embryo riken cdna clone:2700016d05 full insert sequence; hcngp

FIGURE 22-19

cluster analysis I
lung cancer
hypoalhamus

Cluster	Access	Gene	Description
11	NM_009136	20284 Scrg1	scrapie responsive gene 1
11	NM_008547	17152 Mak	male germ cell-associated kinase
11	AL076630	54393 Gabbr1-Ubc	gamma-aminobutyric acid (GABA-B) receptor, 1-ubiquitin D
11	NM_011694	22333 Vdact1	voltage-dependent anion channel vdacl
11	NM_021336		
11	NM_011720		
11	NM_010151	13665 Nr2l1	ovalbumin upstream promoter transcription factor 1 coup-tf1 i submitter comments: homodimer subunit s; coup-tf1
11	NM_009333	21416 Tcf7l2	transcription factor 7-like 2, T-cell specific, HMG-box
11	BC011417	74776	inorganic pyrophosphatase [Homo sapiens] 71 %
11	AK010821	76920	RIKEN cDNA 2410157M17 gene
11	NM_020048		
11	NM_008622	17527 Mpv17	mpv17
11	NM_021325	57781 Mox2r	antigen identified by monoclonal antibody MRC OX-2 recepto
11	AK013916		
11	BC003283	170715 Pabpc4l	poly(A)-binding protein, cytoplasmic 4-like
11	NM_010686	16762 Laptm5	lysosomal-associated protein transmembrane 5
11	NM_024231		
11	M34657	15417 Hoxb9	hoxb9 hox-2.5 abdominal-b homolog; protein
11	NM_025410	66192	cancer/testis antigen 1; cancer/testis antigen [Homo sapiens] 36 %
11	NM_009914	12771 Ccr3	chemokine (C-C) receptor 3
11	NM_025448	66256 Ssr2	signal sequence receptor, beta
11	NM_019635	56274 Srk3	serine/threonine kinase 3 (Sle20, yeast homolog) STK3; protein kinase homolog [Mus musculus] 100 %
11	NM_023472	68558 Anka2	ankyrin repeat, family A (RFXANK-like), 2
11	NM_018501	56075 Tptf	trans-pyrenyltransferase
11	BC017615	94249 Slc24a3	strain cd-1 k+-dependent na/ca exchanger slc24a3 nckx3; sodium calcium done image:3599824
11	AK009282	71897	RIKEN cDNA 2310010M24 gene
11	BC016210	67017	chromosome 20 open reading frame 108 [Homo sapiens] 77 %
11	AF162224	30924 Angptl3	angiopoietin-like 3
11	NM_008903	19012 Ppap2a	phosphatidic acid phosphatase 2a ppap2a
11	NM_010916	18071 Nhlh1	nescient helix loop helix 1
11	AF178528	50757 Fbxo12	F-box only protein 12
11	AK008724		
11	AK005267	68953	Similar to putative breast adenocarcinoma marker (32kD) [Homo sapiens] 99 %
11	NM_009526		
11	NM_025937		
11	NM_032394	17922 Myo7b	myosin-viib
11	BC005517		
11	AK002626		
11	NM_008856		
11	NM_016680		
11	NM_018739		
11	BC004640		
11	NM_033146		
11	AK002327		
11	AF057287		
11	AK014199		
11	AK007580		
11	AK008525		
11	AK008590		
11	AK017626	70544	retinitis pigmentosa 9 homolog (human)
11	NM_009215	20604 Smst	transcriptional co-activator with PDZ-binding motif (TAZ) [91% Homo sapiens]
11	NM_009383	16328 Inmp	Similar to ENP1_HUMAN Ectonucleoside triphosphate diphosphohydrolase 1 (NTPDase1) [Ecto-ATP diphosphohydrolase] 44% uncharacterized bone marrow protein BM033 [85.86% Homo sapiens]
11	NM_008014	14208 Ppm1g	preprosomatostatin Intranuclear protein protein phosphatase 1g formerly 2c magnesium-dependent gamma isoform done mgc:6668
11	M13016		
11	NM_010826		
11	AK017596		
11	NM_022009		

FIGURE 22-20

Cluster Access	Locus	Gene	Description
11 AK005633			
12 AF359382			
12 AK006006			
12 NM_030887	81703	Jundp2	Jun dimerization protein 2
12 AK020723	77764		2004395A melanin-concentrating hormone (100% Mus musculus)
12 AK003179			
12 NM_013827	17765	Mit2	metal response element binding transcription factor 2
12 AK017416			
12 BC003996	193813	Sdnl	neural stem cell derived neuronal survival protein
12 AK014127			
12 AK010426			
12 NM_009362	21784	Thf1	trefoil factor1/ps2 exons 1-3
12 AK021208	77422		RIKEN cDNA C330018D20 gene
12 AJ276505	27267		genomic fragment 281000 bp chromosome; cysteinyl-l-ma-synthetase cysa
12 AF106621	21855	Timm17b	adult male tongue riken cdna clone:2310005c24, 10 days embryo clone:2610108e24
12 NM_009524	22418	Wnt5a	wingless-related MMTV integration site 5A
12 AK014861	70894		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:492151QJ17 product:hypothetical EF-hand containing protein
12 AK013274	19087	Pkar2a	protein kinase, cAMP dependant regulatory, type II alpha
12 BC018220			
12 AK019788			
12 NM_020273	56809	Gmeb1	glucocorticoid modulatory element binding protein 1 [Mus musculus] 100 %
12 AK004331	68816	Ppil1	peptidylprolyl isomerase (cyclophilin)-like 1
12 NM_010253	14419	Gsl	galanin
12 AK013927			
12 AK004009			
12 AK015973			
12 NM_023179			
12 AK011615	71517		esophageal cancer associated protein [Homo sapiens] 92 %
12 Y15910			
12 NM_009038	19668	Rbpsu1	recombining binding protein suppressor of hairless-like (Drosophila)
12 AK005168			
12 BC006876	68038		hypothetical protein MGC3234 [89% Homo sapiens]
12 NM_008292			
12 BC004635	236519		hypothetical protein FLJ12806 [Homo sapiens] 87 % / 305 aa
12 NM_011041	18511	Pax9	pax9
12 X81466	13841	Epha7	erb receptor tyrosine kinase
12 NM_008976	19250	Ptgn14	putative protein tyrosine phosphatase ptp36 a sh3-binding site in the spacer region connecting n-terminal band 4, 1-like domain and c-terminal p
12 NM_026180			
12 NM_023635	11891	Rab27a	rab27a member ras oncogene family clone mgc:11677; as cells riken cdna clone:2410003m20
12 AK008023			
12 NM_019518	56149	Grasp	brain cdna clone mncb-4428 grp1-associated scaffold protein grasp unnamed product
12 AK019591			
12 AK015778	75110		L1 repeat, T1 subfamily, member 29 [69% Mus musculus]
12 NM_019708			
12 AK005864			
12 AK009010			
12 NM_020605	57340	Jph3	junctophilin 3; junctophilin type 3 [Mus musculus] 100 %
12 NM_018869	55981	Pgpb	phosphatidylinositol glycan class b
12 NM_008165	14789	Grai1	glutamate receptor ionotropic ampa1 alpha grai1
12 AK003123			
12 NM_023450			
12 NM_010419	15208	Hes5	hairy and enhancer of split 5 drosophila hes5
12 NM_008235	15205	Hes1	helix-loop-helix factor hes-1
12 AK003278			
12 NM_030717	80907	Lactb	serine beta lactamase-like protein lact-1
12 NM_013562			
12 AK003676	68581	Tmp21	transmembrane trafficking protein
12 AK008060	72058		RIKEN cDNA 2010003D20 gene

Figure 22-21

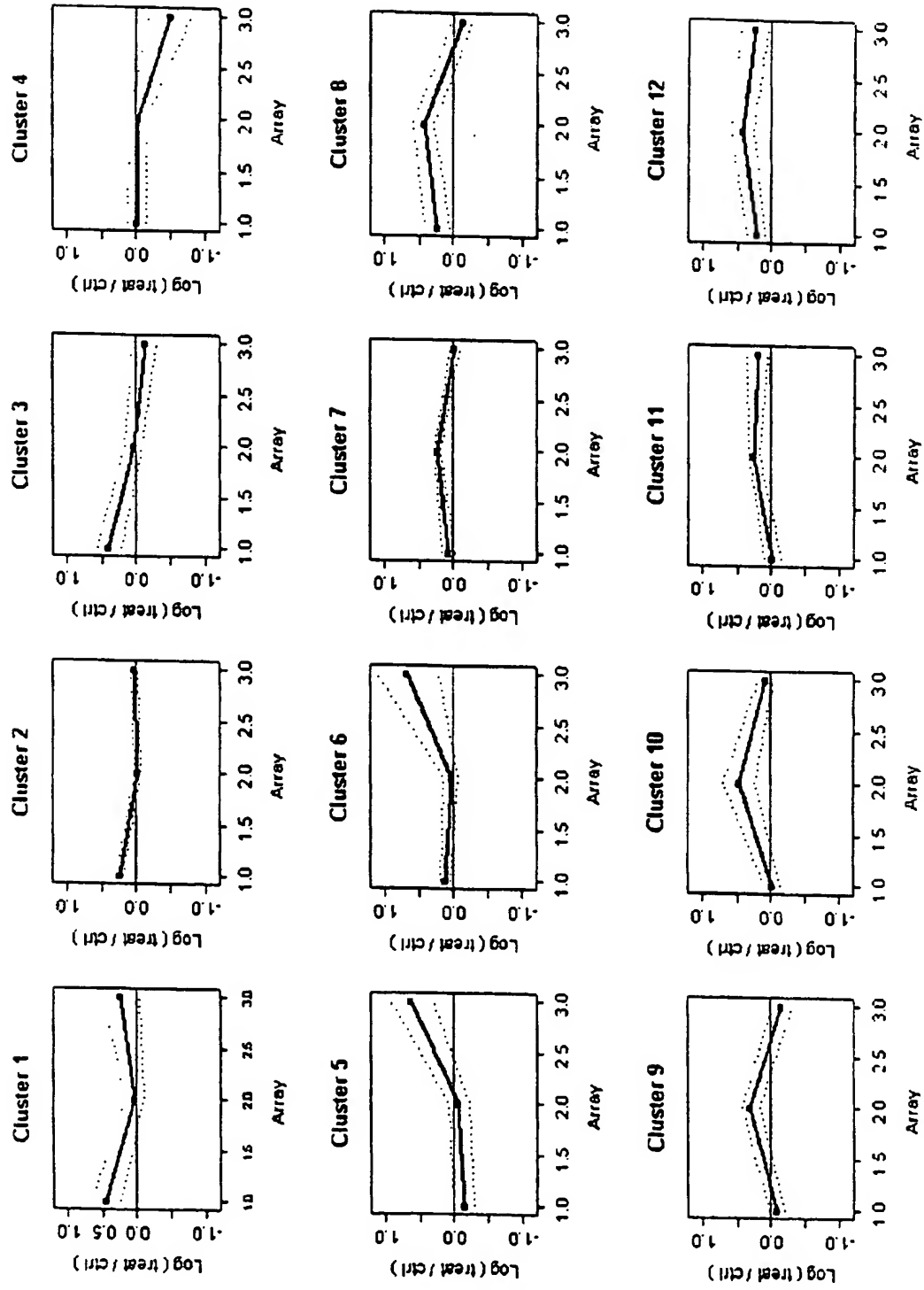


FIGURE 23-1

Cluster Access	Locus	Gene	Description
1 AK015842	75106		RIKEN cDNA 49305.9F16 gene
1 NM_019833	56279		hypothetical protein 1-82 [100% Mus musculus]
1 NM_020606	57342	Parva	parvin, alpha
1 NM_080450	118446	Gja1	gap junction membrane channel protein epsilon 1
1 NM_026126	67391		hepatitis C virus core-binding protein 6 [70% human]
1 AK004552	71712		Similar to hypothetical protein FLJ11259 [Homo sapiens] 93 %
1 AK004164	68777		hypothetical protein FLJ2353 [Homo sapiens] 85 %
1 AK009086	69533		similar to keratin associated protein 4.7 [31% Homo sapiens]
1 NM_010223	14232	Fkbp8	FK506 binding protein 8
1 AK020734	77785		RIKEN cDNA A330104.06 gene
1 AK014905	70892	Pnrbp1	T12515 hypothetical protein DKFZp434B103.1 - (28% human)
1 NM_019938	56523	Ngly1	polyamine modulated factor 1 binding protein 1
1 NM_021504	59007	Vldlr	peptide N-glycanase; peptide:N-glycanase [Mus musculus] 100 %
1 NM_013703	22359		very low density lipoprotein receptor
1 BC016073	68916		RIKEN cDNA 1190055B03 gene
1 NM_010376	14950	H13	histocompatibility 13
1 NM_008866	12614	Celsr1	cadherin egl lag seven-pass g-type receptor celsr1
1 NM_013895	30055	Timm8	translocase of inner mitochondrial membrane 8 homolog (yeast)
1 AK012767	109065		RIKEN cDNA 1110034A24 gene
1 AK004472	68891		polycythemia rubra vera 1; cell surface receptor [Homo sapiens] 49 %
1 AK021182	77616	Aveg	RIKEN cDNA C330060D17 gene
2 NM_009704	11839		amphiregulin
2 AK012535	101513	Prps2	expressed sequence A1256456
2 NM_028662	10639	Kcnc1	phosphoribosyl pyrophosphate synthetase 2
2 NM_008421	16502	Ilrh2	potassium voltage gated channel, Shaw-related subfamily, member 1
2 AK008472	74239	Tceb3	inter-alpha trypsin inhibitor, heavy chain 2
2 NM_013736	27224	Nab1	RabG-interacting protein 2 [Mus musculus] 23.36 %
2 NM_008667	17936	Snd1	transcription elongation factor 8 (SIII), polypeptide 3
2 NM_019776	56463		Ngf-A binding protein 1
2 AK016775	66765	Rgs9	staphylococcal nuclease domain containing 1
2 AK017114	71206	Alp2a1	Similar to myeloid/lymphoid or mixed-lineage leukemia 2 [41% Human]
2 NM_011268	18739		kallidin p60 subunit A 1 (57% human)
2 NM_007504	11937		regulator of g-protein signaling 9-2 isoform rgs9-2 isoform sritatal-enriched alternatively spliced product
2 AK002742	27973	Prlpm	ATPase, Ca++ transporting, cardiac muscle, fast twitch 1
3 AK010322	71989	Grpr	hypothetical protein IMAGE3455200 [84% Homo sapiens]
3 NM_019991	56635	Mos	prolactin-like protein M
3 NM_008177	14829	Cyp2j6	gasirin releasing peptide receptor grpr
3 NM_020021	17451	Rgn	Moloney sarcoma oncogene
3 NM_010008	13110		cytochrome P450, family 2, subfamily i, polypeptide 6
3 NM_009060	19733		regucalcin
3 AK014599	77042		Similar to sperm adhesion molecule 1 (PH-20 hyaluronidase, zona pellucida binding) [45% Homo sapiens]
3 AK009450	71904		RIKEN cDNA 2310021M12 gene
3 AF073881	210376	Alp7b	RIKEN cDNA 9430075G12 gene
3 NM_007511	11979	Lhb	ATPase, Cu++ transporting, beta polypeptide
3 NM_009497	16666	C4-4a	tetrazinizing hormone beta
3 BC016549	72434	38961	GPI-anchored metastasis-associated protein homolog
3 NM_019942	56526		sepin 6
3 AK013108	76917	Pou2a1	Mus musculus 10, 11 days embryo whole body cDNA, RIKEN full-length enriched library, clone:2810417J12 product:hypothetical
3 NM_011136	18985	Terf2ip	POU domain, class 2, associating factor 1
3 NM_020584	57321		telomeric repeat binding factor 2, interacting protein [Mus musculus] 100 %
3 AK012553	77015		2122285A 239FB gene [Homo sapiens] 99 %
3 AK021136	77539		Mus musculus adult male corpus striatum cDNA, RIKEN full-length enriched library, clone:C030040A15 product:hypothetical
3 NM_027334	70152	Nly9a	DKFZP568A0522 protein [Homo sapiens] 83 % / 166 aa
3 AK004729	18044		nuclear transcription factor- γ alpha
3 AK005303	68999		T12476 hypothetical protein DKFZp564L0562.1 - human 98 %
3 AK016812	74085		S10151 transforming protein itm - 56% mouse (strain balb/c)

FIGURE 23-2

Cluster Access	Locus	Gene	Description
4 AF0508955	20916	Succ2	succinate-Coenzyme A ligase, ADP-forming, beta subunit
4 NM_013465	11625	Ahs2	alpha-2-HS-glycoprotein
4 AK020915	87245	Pel1	pellino 1 - rrlNP_075813.1 - pellino 1; RIKEN cDNA 2810468L03 gene [Mus musculus] 100 %
4 NM_053192	94228	Ucc1	upregulated in colorectal cancer gene 1
4 NM_025556	66423		RIKEN cDNA 2410022L05 gene
4 NM_010694	16820	Lcn3	lipocalin 3
4 Y19185	26875	Pcd	piccolo (presynaptic cytomatrix protein)
4 NM_030735	81010	V3R8	phormone receptor V3R9
4 AK011234	72459		Similar to - HIV TAT specific factor 1; cofactor required for Tat activation of HIV-1 transcription [74% Homo sapiens]
4 AK004139	68735		mitochondrial ribosomal protein S18C; CCl-134 protein; mitochondrial ribosomal protein S18-1 [Homo 78 %]
4 NM_021354	13495	Drg2	developmentally regulated GTP binding protein 2
4 NM_028468	67942	Alp5g2	ATP synthase, H+ transporting, mitochondrial F0 complex, subunit c (subunit 9), isoform 2
4 NM_009491	22307	V2r16	voneronasal 2, receptor, 16
4 AK015243	252876		hypothetical protein FLJ20125 [83% Homo sapiens]
4 AF193608	20658	Son	Son cell proliferation protein
4 NM_019476	29849	Olfir19	olfactory receptor 19
4 AK010963	70312		hypothetical protein R31448_3 - human (fragment) (89% human)
4 NM_021319	57757	Pgylp1	peptidoglycan recognition protein-like
4 NM_008707	18107	Nim1	N-myristoyltransferase 1
4 NM_028298	67661		RIKEN cDNA 4930553F24 gene
4 NM_018832	54634	Pdxz	POZ domain containing, X chromosome
4 NM_009740	12042	Bcl10	b-cell leukemia/lymphoma 10
4 NM_020009	56717	Frap1	FK506 binding protein 12-rapamycin associated protein 1
4 AK014993	70961		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921532D01
4 NM_008094	14466	Gba	acid beta glucosidase
4 AK008537	67035		DJB4_MOUSE DnaJ homolog subfamily B member 4 100 %
4 AK013055	67059		hypothetical protein PTD004; homologous yeast-44.2 protein [99% Homo sapiens]
4 AK014983	77058		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4921530D09 product:hypothetical
4 NM_007525	12021	Bard1	BRCA1 associated RING domain 1
4 NM_026693	93739	Gabarp12	GABA(A) receptor-associated protein like 2
4 AK005431	67009		RIKEN cDNA 1600012K10 g...e
5 BC006048	14194	Fh1	formate hydratase 1
5 NM_018685	56505	Ruvb1	RuvB-like protein 1
5 AK016497	70980		RIKEN cDNA 4931431F19 gene
5 NM_022881	64214	Rgs18	regulator of G-protein signaling 18
5 AK007657	69151		protease (prosome, macropain) 26S subunit, ATPase 1
5 NM_008947	19179	Psmc1	RIKEN cDNA 3732407C23 gene
5 AK014404	74014		RIKEN cDNA 5730417B17 gene
5 AK017569	74737		RIKEN cDNA 5430433J05 gene
5 AK017387	71363		zinc finger protein 106
5 AF060246	22647	Zfp108	alpha collagen iv col4a3
5 NM_007734	12828	Col4a3	B-cell leukemia/lymphoma 6
5 NM_009744	12053	Bcl6	DYNC_HUMAN Dynactin complex 50 kDa subunit (50 kDa dynein-associated polypeptide) (Dynamitin) (DCTN-94 %)
5 AK009749	69654		SRX-box containing gene 3
5 NM_009237	20675	Sox3	BCL2adenovirus E1B 19kDa-interacting protein 1, NIP3
5 NM_009760	12176	Brip3	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor-like 1
5 NM_010909	18038	Nfkbi1	Huntingtin interacting protein K; hypothetical protein [Homo sapiens] 99
5 NM_026318	87693		torsin family 1, member 8
5 AJ297743	30934	Tor1b	RIKEN cDNA 4933406P04 gene
5 AK016707	74420		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse 62%
5 AK010800	78797		mannosidase 2, alpha B2
5 AK012664	69922	Vrk2	CA00_HUMAN Protein CGI-100 precursor (89% human)
5 NM_008550	17160	Man2b2	C-terminal PDZ domain ligand of neuronal nitric oxide synthase
5 AK014490	73130		unc-84 homolog A (C. elegans)
5 AK018149	70729	Capon	Mus musculus 10 days embryo whole body cDNA, RIKEN
5 AF343752	77053	Unc84a	
5 AK011324			

FIGURE 23-3

Cluster Access	Locus	Gene	Description
5 AK004854	71709		similar to A49307 98k GTPase-activating protein ABR, brain - human 29 %
5 NM_011374	20449	Sial8a	alpha 28-sialyltransferase gd3 synthase putative
5 AK012063	97181	Dullard	Dullard homolog (Xenopus laevis)
6 NM_025839	66911		hypothetical protein MGC11275; likely ortholog of mouse syndesmos [95% Homo sapiens]
6 NM_025316	66046	Ndu65	NADH dehydrogenase (ubiquinone) 1 beta subcomplex
6 NM_007986	14089	Fap	fibroblast activation protein
6 NM_023217	66522		PGP1 HUMAN Probable pyridoxale carboxyle peptidase (5-oxoprolinyl-peptidase) (Pyrroglutaryl-peptidase 85 %
6 NM_021496	58998	Pvr3	poliovirus receptor-related 3
6 AK005105	68980		Similar to WD domain, C-beta repeat-containing protein [Homo sapiens] 83 %
6 AF215896	11780	Apeg1	striated muscle-specific serine/threonine protein kinase speg
6 NM_023175	52633		Nit protein 2 [89% Homo sapiens]
6 AK019095	78887		similar to pir; T00322 - T00322 hypothetical protein KIAA0542 - human 62 %
6 AF056187	16001	Igf1r	insulin-like growth factor I receptor Igf-I
6 NM_009843	12877	Ctla4	cytotoxic T-lymphocyte-associated protein 4
6 NM_010351	14836	Gsc	goosecoid gsc
6 X58472	16588	Kin	antigenic determinant of rec-A protein
6 NM_009763	12182	Bst1	bone marrow stromal cell antigen 1
6 NM_023755	81879	Ctr1	transcription repressor ctr1-1 developmentally regulated related to the cp2 family of factors
6 M12289	17885	Myh8	perinatal skeletal myosin heavy chain 3 end
6 AK011897	72495		RIKEN cDNA 2810206C17 gene
6 AF448604	72162	Ddx38	CD9 antigen
6 NM_007857	12527	Cd9	tripartite motif protein trim11
6 NM_053168	94091	Trim11	RIKEN cDNA 6330583M11 gene
6 NM_024465	76192	Np15	Nuclear neuronal protein 15.6
6 NM_019435	104130	Hgf	hepatocyte growth factor
6 X72307	15234	Mvp	major vault protein
6 NM_080838	78388		HSPC038 protein [Homo sapiens] 100 %
7 AK004076	68036		LSM3, HUMAN U6 snRNA-associated Sm-like protein LSM3 (MDS017) 100 %
7 NM_026309	67678	Cg184	CGI-94 protein
7 NM_028031	67205		JC6547 high sulfur protein BZE - rat 37 %
7 NM_027170	69696	Pde1c	phosphodiesterase 1C
7 NM_011054	18575	Gnifg	glia maturation factor, gamma3
7 NM_022024	63989		36End772; Tax1 (human T-cell leukemia virus type 1) binding protein 1, tax1-binding protein [Homo sapiens] 80 %
7 NM_025816	52440	Alp5k	alp synthase h+ transporting mitochondrial f1f0 complex subunit e alp5k; f1m-1 f1f0-asease
7 NM_007507	11958	Dnajb12	mdj10 deduced amino acid sequence homologous to c. elegans putative dnaJ protein z73102 b0035.14. homolog
7 NM_019865	56709	Irf3	interferon regulatory factor-3 irf3 irf-3; factor 3
7 NM_016849	54131	Gnpx	guanine nucleotide releasing protein x
7 AK020621	78670		mitochondrial ribosomal protein L4
7 NM_023167	66163	Mrip4	calcium and integrin binding 1 (calmyrin)
7 NM_011870	23991	Cib1	achaele-scutle complex homolog-like 2 (Drosophila)
7 NM_008554	17173	Asc12	putative seven transmembrane spanning receptor puma-g
7 AK007013	74282		UDP-GlcNAc: betaGal beta-1,3-N-acetylglucosaminyltransferase 3
7 NM_030701	80885	Puma-g	BCL2-like 12 (proline rich); Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
7 NM_028189	72297	B3gnt3	Gripe-like 2, mitochondrial
7 AK017362	75736	Gripe2	twist gene homolog 1 (Drosophila)
7 AK003011	17714	Twist1	uncharacterized hypoblastamus protein HCDASE [77% Homo sapiens]
7 NM_011658	22160		9030607L17Rik RIKEN cDNA 9030607L17 gene
7 NM_025855	52685		odorant receptor 16
7 AK018541	71564		complement component 1, q subcomponent, gamma polypeptide
7 AK005678	321010	Ors16	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 bmp15
7 NM_021368	58168	C10g	chaperonin subunit 6a (zeta)
7 NM_007574	12262	Bmp15	interleukin-10 receptor alpha
7 NM_009757	12155	Ct6a	butyrophilin, subfamily 1, member A1
7 NM_009838	12486	Il10ra	SPT3-associated factor 42 [95% Homo sapiens]
7 NM_008348	16154		
7 NM_013483	12231	Bin1a1	
8 BC002307	27878		

FIGURE 23-4

Cluster	Access	Locus	Gene	Description
8	BC000232	216190	Dip3b	Dip3 beta
8	X81365	21367	Cntn2	contactin 2
8	AK018362	71468	Obox1	oocyte specific homeobox 1
8	NM_025581	66488		RIKEN cDNA 2010309E21 gene
8	NM_024203	67544	Evc	RIKEN cDNA 4932442K08 [Mus musculus] 100 %
8	NM_021282	59056		Ellis van Creveld gene homolog (human)
8	J02995	11350	Abi1	leslis-specific c-abl protein
8	AK019388	77134		Mouse 12 days embryo head cDNA, RIKEN full-length enriched library, clone:3010025E17 product:(HNRNP A0) homolog [Homo sapiens]
8	AK020038	77397		Lysozyme C, type M precursor (1.4-beta-N-acetylmuramidase C) (62% Mus musculus)
8	NM_016689	11828	Aqp3	aquaporin
8	NM_010274	14571	Gpd2	glycerol phosphate dehydrogenase 2, mitochondrial
8	BC018186	106707	Rlud	ribosomal large subunit pseudouridine synthase C like
8	NM_009979	13013	Csf9	cystatin 9
8	AK004171	68792		sushi-repeat protein [Homo sapiens] 93 %
8	AK013708	68379	Ciz1	Cip1-interacting zinc finger protein
8	NM_007647	12499	Entpd5	ectonucleoside triphosphate diphosphohydrolase 5
8	AK015411	73993		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930448A20 product:undclassifiable
8	AK010262	71955		Y174_HUMAN Hypothetical protein KIAA0174 95 %
8	AK010720	67623		Similar to seven transmembrane protein TM7SF3 [82% Homo sapiens]
8	AK017789	70573		SN1L_HUMAN Probable serine/threonine protein kinase SNF-1LK [55% human]
8	AK017705	70573		hypothetical protein FLJ10560 [82.88% Homo sapiens]
8	AE000684	146-72073-22074		ter beta locus from bases 250554 to 501917 section 2 of 3 the
8	L07379	14602	Ghrhr	(clone pcn7) growth hormone-releasing factor receptor
8	NM_008602	17344	Miz1	Msk-interacting-zinc finger
8	NM_008996	19324	Rab1	RAB1, member RAS oncogene family
8	AK006894	74281		CU56_MOUSE Putative protein C21orf58 homolog 54.41 %
8	AK018054	76103		A30411 synapsin Ia - 34% rat
8	AK015502	74989	Pcdl	Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:4930465A12 product:hypothetical protein
8	NM_025273	13180		6-pyruvoyl-tetrahydropterin synthase/dimerization cofactor of hepatocyte nuclear factor 1 alpha (TCF1)
8	NM_024273	76916		hypothetical protein MGC7537 [Mus musculus] 100 %
8	NM_010610	16531	Kcnma1	potassium large conductance calcium-activated channel, subfamily M, alpha member 1
8	NM_026177	67487		RIKEN cDNA 1200011118 gene
8	NM_013469	11744	Aqza11	annexin A11
8	NM_031201	22122	Tsta3	tissue specific transplantation antigen P35B
8	NM_021517	59020	Pdzk1	PDZ domain containing 1[Mus musculus] 100 %
8	NM_019964	56631	Dna18	DnaJ (Hsp40) homolog, subfamily B, member 8
9	Z36011	13401	Dmr8	dystrophia myotonia linked gene,
9	NM_009417	22018	Tpo	thyroid peroxidase tpo
9	NM_008353	16161	Il12rb1	interleukin 12 receptor, beta 1
9	AK021408	76733		- [39487] laslin - human 51.90 %
9	NM_011595	21859	Timp3	tissue inhibitor of metalloproteinases-3
9	NM_023305	67123	Ubap1	ubiquitin-associated protein 1
9	AK015684	68722		hypothetical protein FLJ22724 [68% Homo sapiens]
9	NM_008069	14400	Gabrb1	gamma-aminobutyric acid (GABA-A) receptor, subunit beta 1
9	AK019934	70255		pir:T14768 - T14768 hypothetical protein DKF Zp566K1924.1 - human (fragment) 93.58 %
9	AK017362	75736		BCL2-like 12 (proline rich), Bcl-2 like proline-rich protein 12 [Homo sapiens] 81 %
9	BC003957	78408		KIAA0773 gene product [31.09% Homo sapiens]
9	AK016205	76734		adult male medulla oblongata riken cDNA clone:6330437111
9	AK009004	69539		SYN1_MOUSE Synapsin 1 30 %
9	NM_028732	74048	Hnrpd	RIKEN cDNA 4632428N05 gene
9	NM_016690	50926		heterogeneous nuclear ribonucleoprotein D-like
9	NM_007674	12592	Cdx4	caudal type homeo box cdx4
9	NM_016788	53318	Pdim3	PDZ and LIM domain 3
9	NM_008675	17965	Nbl1	neuroblastoma, suppression of tumorigenicity 1
9	AF193437	20669	Sox14	SRV-box containing gene 14
9	NM_026395	67830		similar to S. cerevisiae RER1 [Homo sapiens] 96 %
9	AF333960	70122	Mm13	myeloid/lymphoid or mixed lineage leukemia translocation to 3 homolog (Drosophila)

FIGURE 23-5

Cluster Access	Locus	Gene	Description
9 NM_025443	66249		RIKEN cDNA 1810003N24 gene
9 AK018094	78157	Frd1	src, fringe-like 1 (Drosophila)
9 NM_011427	20813	Snai1	snail homolog drosophila
10 NM_022022	63958	Ube4b	ubiquitination factor E4B, UFD2 homolog (S. cerevisiae)
10 AK004953	76281		Tax interaction protein 1 [Homo sapiens] 99 %
10 BC010586	66734	Mx4ac6	microtubule-associated protein 1 light chain 3-like protein 1; microtubule-associated proteins 1A/1B light chain 3 [100% Homo sapiens]
10 NM_028595	73556		membrane-spanning 4-domains, subfamily A, member 6C
10 AK012054	72519		T50621 hypothetical protein DKFZp762O076.1 - human (fragment)[96% human]
10 NM_009116	20204	Prrx2	paired related homeobox 2
10 AF305427	252967	Akapasp	A-kinase anchoring protein-associated sperm protein
10 AK016299	75894		KIAA0547 gene product [80% Homo sapiens]
10 AK006670	73259		KIP1, MOUSE DNA-PKcs interacting protein (Kinase Interacting Protein) (KIP) (Calcium and integrin-bin 43 %
10 AK015706	107767	Scamp1	SECRETORY CARRIER-ASSOCIATED MEMBRANE PROTEIN 1
10 BC004855	103468		AS4142 nucleoprotein NUP107 - 85.69% rat
10 AF230395	22870	Trim26	Inpartite motif protein Trim26 alpha
10 NM_009483	22310	Vztr4	vomerionasal 2, receptor, 4
10 AK006094	72245		AD16, HUMAN Protein AD-016 (Protein CGI-118) (x0009) 90 % /
10 AK004206	67282		neurotrophin
10 NM_019515	56183	Nmu	brain protein 16; DNA segment, Chr 15, ERATO Dcl 741, expressed [Mus musculus] 100 %
10 NM_021555	59053	Brip16	endometrial bleeding associated factor
10 NM_010094	13590	Ebat	artemin
10 NM_009711	11876	Arlrn	RIKEN cDNA 4930420821 gene
10 NM_026249	67576	Gent2	glucosaminyltransferase, I-branching enzyme
10 AB037596	14536		RIKEN cDNA 2610028H24 gene
10 AK011591	76984	Psmc4	proteasome (prosome, macropain) 26S subunit, non-ATPase, 4
10 NM_008951	19185		paternally expressed 10
10 NM_022429	170676	Peg10	RIKEN cDNA 4933433C11 gene
10 AF302691	74472		Sec3-like; homolog of yeast exocyst protein Sec3p [Homo sapiens] 96 %
10 AK017033	69940	Igsf6	immunoglobulin superfamily member Igsf6
10 AK013041	80719		patched related protein translocated in renal cancer [28.14% Homo sapiens]
10 NM_030691	74315		glutamic acid decarboxylase 1
10 AK014408		Gad1	chromosome 12 open reading frame 2; carcinoma associated [89% Homo sapiens]
10 NM_007411	14415		mitogen-activated protein kinase 6
10 NM_008077	71323	Mapk6	TLH28 protein precursor [Homo sapiens] 63 %
11 NM_015806	50772		simple repeat sequence-containing transcript [28% Mus musculus]
11 AK010014	76933		Rho-associated coiled-coil forming kinase 2
11 BC003203	104479	Rock2	Mus musculus breakpoint cluster region homolog, mRNA (cDNA clone IMAGE:3488874)
11 NM_009072	19878		chromosome condensation protein G
11 BC002193	54392	Hcapg	molybdenum cofactor sulfuryase
11 AJ237585	68591	Hmcs	myxovirus (influenza virus) resistance 1
11 AK003797	17857	Mx1	hypothetical protein MGC2550 (84% human)
11 NM_010846	69520		cyclin L2
11 AK005661	56036	Ccnl2	cystatin B
11 AK007552	13014		syntrophin
11 NM_007793	101489	Cetb	germ cell-specific ankyrin, SAM and basic leucine zipper domain containing protein
11 NM_053194	101489	Gas2	thymine DNA glycosylase
11 AK016595	74068		RIKEN cDNA 1700027A23 gene
11 NM_011561	21685	Tdg	actin, beta, cytoplasmic
12 AK008407	76420	Actb	simple repeat sequence-containing transcript
12 NM_007393	11461		phosphodiesterase related
12 NM_009276	20819	Srsf1	glutathione S-transferase, theta 1
12 NM_008961	19212	Pter	Alpase, class VI, type 11C
12 NM_008185	14871	Gstt1	
12 AF156547	54668	Alp11c	
12 AF109906	54668		CRYL_HUMAN Lambda-crystallin homolog 83 %
12 BC004074	66631	Cyl1	

FIGURE 23-6

Cluster Access	Locus	Gene	Description
12 NM_019694	56384	Leim1	leucine zipper-EF-hand containing transmembrane protein 1
12 AK004882	50500	Ttpa	tocopherol (alpha) transfer protein
12 NM_009796	12339	Capn7	calpain 7
12 NM_022424	64339		hypothetical protein FLJ22362 (98% human)
12 NM_026667	68303		days neonate head riken cdna clone:5430425h06; 9130005n14 9130005n14rik
12 AK002818	67437		signal sequence receptor, gamma (translocase-associated protein gamma) [Homo sapiens] 98 %
12 NM_031251	83429	Cttns	clone mgc:7273
12 NM_025965	107513	Ssr1	signal sequence receptor, alpha
12 AB056457	102294	Cyp4v3	cytochrome P450, family 4, subfamily v, polypeptide 3
12 NM_013500	30060	Mf12	antigen p97 (melanoma associated) identified by monoclonal antibodies 133.2 and 96.5
12 NM_029562	76279	Cyp2d28	cytochrome P450, family 2, subfamily d, polypeptide 26
12 AK015650	87509		hypothetical protein FLJ11101 [76% Homo sapiens]
12 NM_017393	53895	Clpp	caseinolytic protease, ATP-dependent, proteolytic subunit homolog (E. coli)
12 NM_025589	66483		ribosomal protein L36a; 60S ribosomal protein L44; L44-like ribosomal protein; ribosomal protein L4 (100% human)
12 AK003864	66169		OM07_HUMAN Probable mitochondrial import receptor subunit TOM7 homolog (Translocase of outer membrane 94 %
12 AK003413	68001		CU59_HUMAN Protein C21orf59 92 %
12 AK016777	67539	Cd7	IB0466 gene tlg protein - 36% rat (fragment)
12 NM_009854	12516		cd7 antigen
12 BC005662	210992	F13a	cDNA sequence BC005662
12 NM_028784	74145		coagulation factor XIII, alpha subunit
12 AK006335	68416		RIKEN cDNA 1700025F22 gene

Figure 23-7

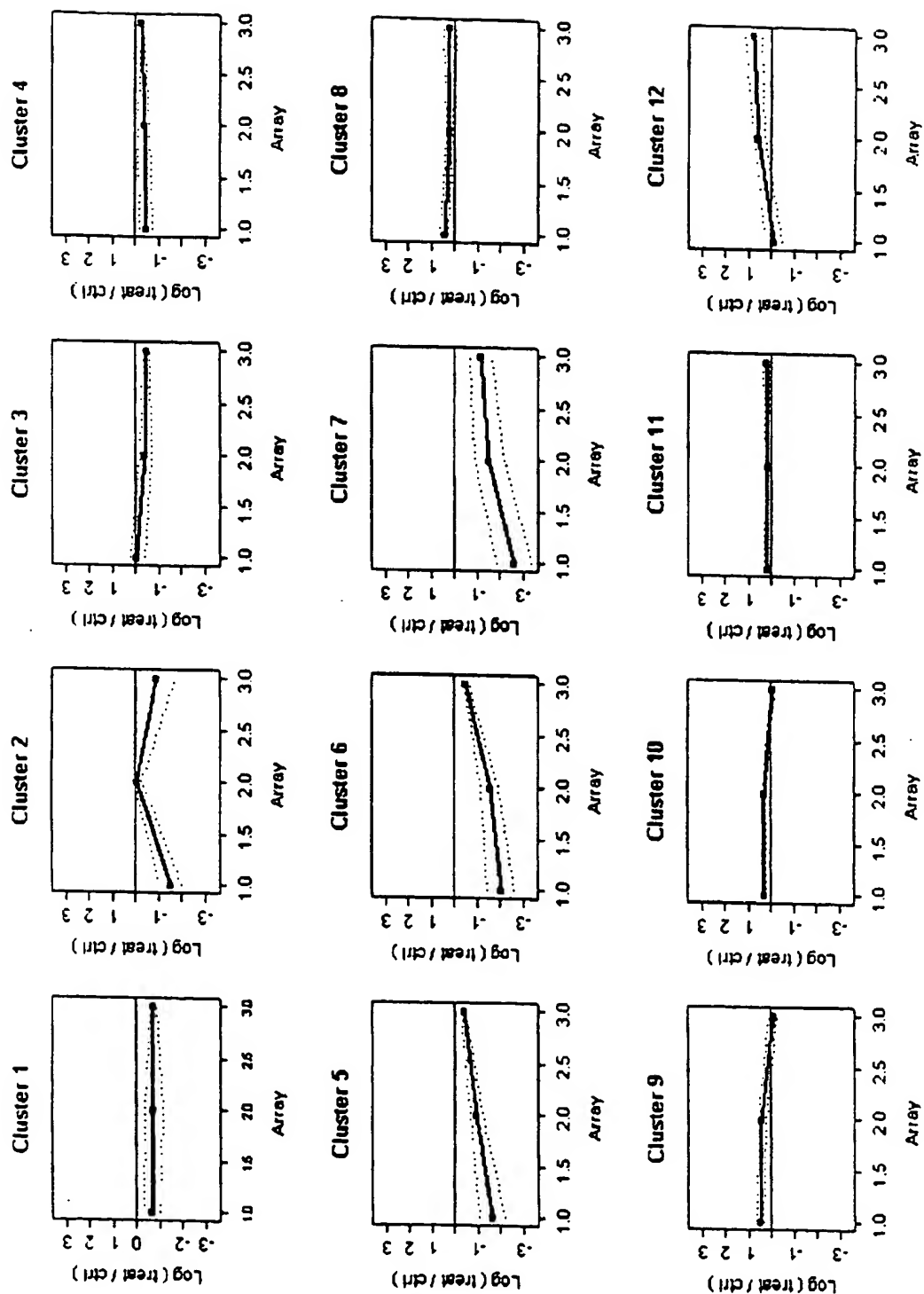


Figure 24A

DIFFERENTIALLY EXPRESSED GENES (SELECTED)

Colon

Accession	Gene	Description	Class	Region
X72307	Hgf	hepatocyte growth factor	growth factor	Cortex
U92885	EfnA3	ephrin A3	growth factor	Cortex
NM_025906	Cts3	cathepsin 3	protein degradation (secreted)	Hypothalamus
NM_025496	plp1	prolactin like protein 1	growth factor	Cortex
NM_021704	Cxcl12	chemokine (C-X-C motif) ligand 12, 181182 cytokine - mouse 100 %	immune response (secreted)	Hypothalamus
NM_021380	Il20	interleukin 20 il20	growth factor	Cortex
NM_017383	Cntr6	contactin 6 - neural recognition molecule NB-3 [Mus musculus] 100 %	immune response (secreted)	Midbrain
NM_016851	Irf6	interferon regulatory factor 6 mirf6 irf6 transcription: clone mgc5918	immune response (secreted)	Midbrain
NM_013857	Sema3	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3C	growth factor	Cortex
NM_013552	Ccl4	chemokine (C-C motif) ligand 4	growth factor	Striatum
NM_011165	Prlpa	prolactin-like protein A	growth factor	Midbrain
				Cortex
NM_010735	Lta	lymphotxin A	growth factor	Striatum
NM_009971	Csf3	colony stimulating factor 3 (granulocyte)	immune response (secreted)	Striatum
NM_009757	Bmp15	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 bmp15	growth factor	Hypothalamus
				Cortex
NM_009640	Angpt	angiopoietin	growth factor	Midbrain
				Cortex
NM_009500	Vav2	vav2 oncogene	growth factor	Striatum
				Midbrain
				Cortex
NM_009390	Tti	teloid-like	protein degradation (secreted)	Striatum
NM_009129	Scg2	secretogranin II	growth factor	Hypothalamus
NM_009043	Reg2	regenerating islet-derived 2	growth factor (secreted)	Hypothalamus
NM_008930	Prlpe	prolactin-like protein E	growth factor	Midbrain
NM_008675	Nbl1	neuroblastoma, suppression of tumorigenicity 1	growth factor	Cortex
			tumor related (secreted)	Midbrain
NM_008382	Inhbe	defense/immunity protein activity, indoleamine-pyrole 2,3-dioxygenase activity	growth factor	Hypothalamus
NM_008343	Igf1bp3	insulin-like growth factor binding protein-3	growth factor	Striatum
NM_008108	Gdf3	growth differentiation factor 3	growth factor	Cortex
NM_008007	Fgf3	fibroblast growth factor 3	growth factor	Cortex
NM_008004	Fgf17	fibroblast growth factor 17	growth factor	Midbrain
NM_007995	Fcna	ficollin A	growth factor	Cortex
AK020723		2004395A melanin-concentrating hormone (100% Mus musculus)	immune response (secreted)	Hypothalamus
AK020305		sp.P11590 - MUP4_MOUSE Major urinary protein 4 precursor (MUP 4) 39 %	growth factor	Hypothalamus
AK017955	Myt1	melanocyte proliferating gene 1	transport (secreted)	Cortex
			signaling (secreted)	Midbrain
				Cortex
				Striatum
AK009012	Chit1	chitinase 1 (chitotriosidase)	immune response (secreted)	Hypothalamus
AK008922	Fgf22	fibroblast growth factor 22	growth factor	Cortex
AF360358	ORF9	open reading frame 9	growth factor	Striatum
AF158744	Prlpc2	prolactin-like protein C 2	growth factor	Cortex
				Striatum

Figure 24B

DIFFERENTIALLY EXPRESSED GENES (SELECTED)

Breast.

Accession	Gen	Description	Class	Region
X76290	Shh	chymotrypsin activity, growth factor activity...	growth factor	Hypothalamus
X72307	Hgf	hepatocyte growth factor	growth factor	Midbrain
U52885	Etna3	epherin A3	growth factor	Cortex
U56650	Nxph2	neurexophilin 2	signaling (secreted)	Cortex
NM_055192	Ucc1	upregulated in colorectal cancer gene 1	tumor related (secreted)	Midbrain
NM_023517	Tnfrsf13	tumor necrosis factor (ligand) superfamily, member 13	growth factor	Midbrain
NM_023409	npc2	Nicmana Pick type C2	miscellaneous (secreted)	Cortex
NM_021283	It4	intereuxin 4	growth factor	Midbrain
NM_020597	Msmb	beta-microseminoprotein; beta-inhibin; prostatic inhibin protein (Mus musculus)	growth factor	Hypothalamus
NM_019941	Prp1a	proactin-like protein M	growth factor	Midbrain
NM_019775	Cpb2	carboxypeptidase B2 (plasma)	growth factor	Midbrain
NM_019626	Cbin1	cerebelin 1 precursor protein	protein degradation (secreted)	Hypothalamus
NM_017389	Esr4	eosinophil-associated ribonuclease 4	growth factor	Midbrain
NM_017383	Cntr6	contactin 6 - neural recognition molecule NB-3 [Mus musculus] 100 %	miscellaneous (secreted)	Hypothalamus
NM_015770	a	nonagouti	immune response (secreted)	Midbrain
NM_013652	Ccl4	chemokine (C-C motif) ligand 4	signaling (secreted)	Hypothalamus
NM_011888	Ccl19	chemokine (C-C motif) ligand 19	growth factor	Cortex
NM_011187	Prp1c1	proactin-like protein C 1	growth factor	Hypothalamus
NM_010504	Ifna4	interferon alpha family, gene 4	growth factor	Midbrain
NM_010203	Fgf5	fibroblast growth factor-5 fgf-5 dna exon	growth factor	Cortex
NM_010197	Fgf1	fibroblast growth factor 1	growth factor	Midbrain
NM_009971	Csf3	colony stimulating factor 3 (granulocyte)	immune response (secreted)	Cortex
NM_009757	Bmp15	growth differentiation factor-9b gdf-9b, bone morphogenetic protein 15 bmp15	growth factor	Midbrain
NM_009311	Tac1	tachykinin 1	growth factor	Cortex
NM_009255	Serpine2	serine (or cysteine) proteinase inhibitor, clade E, member 2	protein degradation (secreted)	Hypothalamus
NM_009141	Cxcl5	chemokine (C-X-C motif) ligand 5	growth factor	Midbrain
NM_009042	Reg1	regenerating islet-derived 1	growth factor (secreted)	Cortex
NM_008987	Plx3	plexin related gene	immune response (secreted)	Cortex
NM_008930	Prp1e	proactin-like protein E	growth factor	Midbrain
NM_008734	Hrg3	neuregulin 3	growth factor	Hypothalamus
NM_008675	Nbl1	neuroblastoma, suppression of tumorigenicity 1	growth factor	Cortex
NM_008493	Lep	leptin	tumor related (secreted)	Midbrain
NM_008243	Igf1bp3	insulin-like growth factor binding protein-3	growth factor	Cortex
NM_007423	Afp	alpha fetoprotein	growth factor	Midbrain
D01093	Pcsk4	proprotein convertase subtilisin/kexin type 4	miscellaneous (secreted)	Midbrain
AK0114745		YA02_HUMAN HYPOTHETICAL PROTEIN DJ1198H6.2 (50% HUMAN)	growth factor	Cortex
AK017955	Myg1	melanocyte proliferating gene 1	growth factor	Midbrain
AK015642		CERU_MOUSE CERULOPLASMIN PRECURSOR (FERROXIDASE) (96% Mus musculus)	signaling (secreted)	Hypothalamus
AK013765	Ecsf1	endothelial cell growth factor 1 (platelet-derived)	miscellaneous (secreted)	Cortex
AK009012	Chd8	chitinase 1 (chitinotrioseidase)	growth factor	Midbrain
AK008922	Fgf22	fibroblast growth factor 22	immune response (secreted)	Midbrain
AK006679		Mus musculus adult male testis cDNA, RIKEN full-length enriched library, clone:1700041N15 product:1	growth factor	Cortex
AF210429	Pla2g10	phospholipase A2, group X	miscellaneous (secreted)	Midbrain

Figure 24C

DIFFERENTIALLY EXPRESSED GENES (SELECTED)

Lung

Accession	Gen	Description	Class	Region
N72367	Hgf	hepatocyte growth factor	growth factor	Midbrain Cortex Striatum
U02885	EfnA3	epherin A3	growth factor	Hypothalamus
U56850	Nxph2	neurexophilin 2	signaling (secreted)	Striatum
U18746	Fgf8	fibroblast growth factor 8	growth factor	Cortex
NM_053192	Ucc1	upregulated in colorectal cancer gene 1	tumor related (secreted)	Hypothalamus Midbrain
NM_029269		Secreted phosphoprotein 24 precursor (Spp-24) (Secreted phosphoprotein 2) (66% human)	miscellaneous (secreted)	Cortex
NM_028784	F13a	coagulation factor XIII, alpha subunit	immune response (secreted)	Hypothalamus
NM_026087	Ceacam12	CEA-related cell adhesion molecule 12-RIKEN cDNA 1800031J20; Ceacam12-C1; Ceacam12	tumor related (secreted)	Hypothalamus
NM_023317	Tnfrsf13	tumor necrosis factor (ligand) superfamily, member 13	growth factor	Midbrain
NM_021782	Il21	interleukin 21	growth factor	Cortex Striatum
NM_021704	Cxcl12	chemokine (C-X-C motif) ligand 12, 181182 cytokine - mouse 100 %	immune response (secreted)	Cortex
NM_021489	F12	coagulation factor XII (Hageman factor)	miscellaneous (secreted)	Hypothalamus
NM_021380	Il20	interleukin 20 il20	growth factor	Midbrain
NM_021283	Il4	interleukin 4	growth factor	Hypothalamus
NM_021274	Cxcl10	chemokine (C-X-C motif) ligand 10	growth factor	Midbrain
NM_020597	Mtmb	beta-microseminoprotein; beta-inhibin; prostatic inhibin protein [Mus musculus]	growth factor	Midbrain
NM_020021	Mos	Moloney sarcoma oncogene	growth factor	Cortex Hypothalamus Midbrain
NM_019491	Prlpm	prolactin-like protein M	growth factor	Cortex
NM_018450	Il1f8	interleukin 1 family, member 6	growth factor	Hypothalamus
NM_015770	8	nonagouti	growth factor	Striatum
NM_013657	Scma3	soma domain, immunoglobulin domain (Ig), short basic domain, secreted (semaphorin) 3C	signaling (secreted)	Hypothalamus
NM_013652	Ccl4	chemokine (C-C motif) ligand 4	growth factor	Cortex
NM_013465	Ahsg	alpha-2-HS-glycoprotein	growth factor	Cortex
NM_011697	Vegfb	vascular endothelial growth factor B	protein degradation (secreted)	Striatum
NM_011423	Smr3	submaxillary gland androgen regulated protein smr3; masg1	growth factor	Hypothalamus
NM_011330	Cd11	small chemokine (C-C motif) ligand 11	growth factor	Midbrain
NM_011165	Prlpa	prolactin-like protein A	growth factor	Midbrain
NM_010253	Gal	galanin	growth factor	Midbrain
NM_009757	Bmp15	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 bmp15	growth factor	Cortex
NM_009732	Avp	arginine vasopressin	growth factor	Hypothalamus
NM_009704	Ang	angiotensin	growth factor	Midbrain
NM_009500	Vav2	vav2 oncogene	growth factor	Striatum
NM_009362	Tnf1	trefoil factor1/psa2 exons 1-3	growth factor	Hypothalamus
NM_009311	Tac1	tachykinin 1	growth factor	Hypothalamus
NM_009285	Slc	stanniocalcin	growth factor	Cortex
NM_009255	Serpine2	serpin (or cysteine) proteinase inhibitor, clade E, member 2	growth factor	Midbrain
NM_009141	Cxcl5	chemokine (C-X-C motif) ligand 5	protein degradation (secreted)	Striatum
NM_009129	Scg2	secretogranin II	growth factor	Midbrain
NM_008675	Nbl1	neuroblastoma, suppression of tumorigenicity 1	growth factor	Cortex
NM_008520	Ltbp3	latent transforming growth factor beta binding protein 3	tumor related (secreted)	Midbrain
NM_008497	Lhb	luteinizing hormone beta	signaling (secreted)	Striatum
NM_008351	Il12a	interleukin 12 p35 subunit	growth factor (secreted)	Hypothalamus
NM_008004	Fgf17	fibroblast growth factor 17	growth factor	Midbrain
NM_007945	Fcna	ficollin A	growth factor	Striatum
M14872	Gnrm	gnrh-gap encoding gonadotropin-releasing hormone and gn-rh-associated peptide gap precursor	immune response (secreted)	Hypothalamus
D01093	Pcsk4	proprotein convertase subtilisin/kexin type 4	growth factor	Midbrain
AK020723		2004395A melanin-concentrating hormone (100% Mus musculus)	growth factor	Striatum
AK017955	Myf1	melanocyte proliferating gene 1	growth factor	Midbrain
AK015642		CERU_MOUSE CERULOPLASMIN PRECURSOR (FERROXIDASE) (96% Mus musculus)	signaling (secreted)	Cortex Hypothalamus
AK008322	Fgf22	fibroblast growth factor 22	miscellaneous (secreted)	Striatum
AK006679		Mus musculus adult male testis cDNA, RIKEN full-length cDNA library, clone 1700041N15 product C	growth factor	Midbrain
AK005458	Prlpn	prolactin-like protein N	growth factor	Cortex
AF210429	Pla2g10	phospholipase A2, group X	growth factor	Striatum
			miscellaneous (secreted)	Midbrain

FIGURE 25A

DRUG TARGETING CANDIDATES

Colon Cancer

Accession	Gene	Description	Class	Region
N15643	Adrb2	adrenergic receptor, beta 2	signaling (receptor)	Cortex
NM_031257	Plekha2	pleckstrin homology domain-containing, family A (phosphoinositide binding specific) member 2	signaling (receptor)	Hypothalamus
NM_030733	Gpr3	G protein-coupled receptor PSP24-2 [Mus musculus] 100 %	signaling (receptor)	Hypothalamus
NM_030726	Gpr90	G protein-coupled receptor 90	signaling (receptor)	Midbrain
				Cortex
				Striatum
NM_030701	Puma-g	putative seven transmembrane spanning receptor puma-g	signaling (receptor)	Hypothalamus
				Cortex
				Striatum
NM_030553	Olf160	Olf160	signaling (receptor)	Hypothalamus
NM_030258		hypothetical protein, MGC:7035; hypothetical protein MGC7035 [Mus musculus] 100 %	signaling (receptor)	Hypothalamus
NM_022427	Gpr88	G-protein coupled receptor 88	signaling (receptor)	Hypothalamus
NM_021458	Fzd3	frizzled homolog 3 drosophila fzd3	signaling (receptor)	Hypothalamus
NM_021457	Fzd1	frizzled-1	signaling (receptor)	Hypothalamus
NM_021406	Trem3	triggering receptor expressed on myeloid cells 1	signaling (receptor)	Midbrain
NM_021368	Osr16	odorant receptor 16	signaling (receptor)	Midbrain
				Midbrain
				Cortex
NM_020598	Olf17	olfactory receptor 17	signaling (receptor)	Hypothalamus
NM_020518	Ctn1	cortical thymocyte receptor (X. laevis CTX) like	immune response (receptor)	Midbrain
				Striatum
NM_020515	Osr16	gene for odorant receptor A16	signaling (receptor)	Hypothalamus
				Cortex
NM_020481	Gabrq	gaba-a receptor theta subunit family member	signaling (receptor)	Striatum
				Midbrain
NM_020292	MOR32-4	olfactory receptor MOR32-4 - odorant receptor S46 gene [Mus musculus] 97 %	miscellaneous (receptor)	Cortex
				Midbrain
NM_020288	Osr1	odorant receptor S1 gene [Mus musculus] 100 %	miscellaneous (receptor)	Hypothalamus
NM_019952	Btd	B-cell stimulating factor	signaling (receptor)	Cortex
NM_019691	Gria4	glutamate receptor ionotropic ampa4 alpha 4 gria4	signaling (receptor)	Cortex
NM_019476	Olf159	olfactory receptor 159	signaling (receptor)	Midbrain
				Midbrain
				Cortex
NM_018780	Sfrp5	secreted frizzled-related sequence protein 5	signaling (receptor)	Hypothalamus
				Midbrain
				Cortex
				Striatum
NM_016719	Grb14	growth factor receptor bound protein 14	signaling (receptor)	Hypothalamus
NM_016675	Cldn2	claudin 2	signaling (receptor)	Cortex
				Cortex
NM_015766	Ebi	Epstein-Barr virus induced gene 3	signaling (receptor)	Striatum
NM_013887	Oprn4	opsin 4 (melanopsin)	signaling (receptor)	Hypothalamus
NM_013845	Ror1	receptor tyrosine kinase-like orphan ror1 - ROR1_MOUSE Tyrosine-protein kinase transmembrane	signaling (receptor)	Cortex
NM_013728	Olf154	olfactory receptor 154	signaling (receptor)	Striatum
NM_013619	Olf67	olfactory receptor 67	signaling (receptor)	Midbrain
NM_013616	Olf64	olfactory receptor 64	signaling (receptor)	Cortex
				Cortex
NM_013483	Btla1	butyrophilin, subfamily 1, member A1	immune response (receptor)	Striatum
NM_011999	Clec4e	C-type (calcium dependent, carbohydrate recognition domain) lectin, superfamily member 6	signaling (receptor)	Striatum
				Midbrain
				Cortex
				Striatum
NM_011519	Sdc1	syndecan 1	signaling (receptor)	Hypothalamus
				Striatum
NM_011328	Scn	secretin	signaling (receptor)	Hypothalamus
NM_011210	Ptpro	protein tyrosine phosphatase, receptor type, O	signaling (receptor)	Cortex
				Cortex
NM_010483	Htr5b	5-hydroxytryptamine (serotonin) receptor 5B	signaling (receptor)	Striatum
NM_010327	Gp1bb	glycoprotein Ib, beta polypeptide	cell adhesion (receptor)	Midbrain
NM_009914	Ccr3	chemokine (C-C) receptor 3	immune response (receptor)	Cortex
NM_009651	Akap4	A kinase (PRKA) anchor protein 4	signaling (receptor)	Midbrain
NM_009493	V2r4	vomerionasal 2, receptor, 4	signaling (receptor)	Cortex
NM_009325	Tbxa2r	thromboxane a2 receptor	receptor	Cortex
NM_008962	Pgdr	prostaglandin D receptor	signaling (receptor)	Striatum
NM_008720	Npc1	niemann pick type c1	signaling (receptor)	Cortex
NM_008559	Mclr	melanocortin 1 receptor	signaling (receptor)	Midbrain
NM_008474	Lag3	lymphocyte-activation gene 3	immune response (receptor)	Cortex
				Midbrain
				Cortex
				Striatum
NM_008364	Il1rap	interleukin 1 receptor accessory protein	signaling (receptor)	Hypothalamus
NM_008338	Ifngr2	interferon gamma receptor 2	immune response (receptor)	Cortex
				Midbrain

FIGURE 25B

Accession	Gen	Description	Class	Region
NM_008100	Opn1mw	opsin 1 (cone pigments), medium-wave-sensitive (color blindness, deutan)	signaling (receptor)	Cortex
NM_008076	Gabr2	gamma-aminobutyric acid gaba-a receptor subunit rho 2 gabr2	signaling (receptor)	Cortex
NM_008074	Gabrg3	gamma subunit of the gaba-alpha receptor	signaling (receptor)	Hypothalamus
NM_009055	Fzd4	frizzled homolog 4 drosophila fzd4	signaling (receptor)	Striatum
NM_007904	Ednrb	endothelin-b receptor ednrb	signaling (receptor)	Cortex
NM_007900	Ect2	ect2 oncogene	signaling (receptor)	Midbrain
NM_007699	Chrm4	cholinergic receptor muscarinic 4 chrm4	signaling (receptor)	Cortex
NM_007680	Ephb6	map putative	signaling (receptor)	Striatum
M76699	Rho	rhodopsin	signaling (receptor)	Midbrain
AK017571	Chrm3	cholinergic receptor, nicotinic, beta polypeptide 3	signaling (receptor)	Cortex
AK014671		antigen identified by monoclonal antibody MRC OX-2 receptor (41% Mus musculus)	signaling (receptor)	Midbrain
AK014543		progesterone membrane binding protein [73% Homo sapiens]	signaling (receptor)	Cortex
AK010800		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse	immune response (receptor)	Midbrain
AK009282		RIKEN cDNA 131001Q24 gene	signaling (receptor)	Striatum
AK006680		CLD2_MOUSE CLAUDIN-2.23 %	signaling (receptor)	Hypothalamus
AF320126	Grr1	metabotropic glutamate receptor type 1 (GluR1)	signaling (receptor)	Cortex
AF282301	MOR224-4	olfactory receptor MOR224-4	signaling (receptor)	Striatum
AF132300	mor17-1	olfactory receptor mor17-1	signaling (receptor)	Hypothalamus
			signaling (receptor)	Cortex
			signaling (receptor)	Striatum

Breast Cancer

Accession	Gen	Description	Class	Region
X59150	Tcrb-V20	T-cell receptor beta, variable V20	signaling (receptor)	Midbrain
U89015	F11r	F11 receptor	signaling (receptor)	Hypothalamus
U82439	Ptpn22	protein tyrosine phosphatase 12-2beta ptp an autoantigen in insulin-dependent diabetes mellitus: ph	signaling (receptor)	Midbrain
NM_033269	Chrm3	ACM3_MOUSE Muscarinic acetylcholine receptor M3 (Mm3 mAChR) 100 %	signaling (receptor)	Cortex
NM_032465	Tactile	T cell activation, increased late expression	signaling (receptor)	Cortex
NM_032400	Gpr91	G protein-coupled receptor 91	signaling (receptor)	Hypothalamus
NM_032002	Nrg4	neuregulin 4 nrg4	signaling (receptor)	Hypothalamus
			signaling (receptor)	Midbrain
			signaling (receptor)	Cortex
NM_031373	Ox6	opioid growth factor receptor	signaling (receptor)	Hypothalamus
NM_030735	V3R9	pheromone receptor V3R9	signaling (receptor)	Midbrain
			signaling (receptor)	Cortex
NM_030701	Puma-g	putative seven transmembrane spanning receptor puma-g	signaling (receptor)	Hypothalamus
NM_030553	Olf160	Olf160	signaling (receptor)	Midbrain
NM_028595	Msa6oc	membrane-spanning 4-domains, subfamily A, member 6C	immune response (receptor)	Hypothalamus
NM_025771	Comap2	contactin associated protein-like 2	cell adhesion (receptor)	Cortex
NM_021458	Fzd3	frizzled homolog 3 drosophila fzd3	signaling (receptor)	Hypothalamus
NM_021457	Fzd1	frizzled-1	signaling (receptor)	Hypothalamus
NM_021406	Trem1	triggering receptor expressed on myeloid cells 1	signaling (receptor)	Cortex
NM_021332	Glp1r	glucagon-like peptide 1 receptor	signaling (receptor)	Cortex
NM_021325	Mos2r	antigen identified by monoclonal antibody MRC OX-2 receptio	signaling (receptor)	Midbrain
NM_020598	Olf117	olfactory receptor 17	signaling (receptor)	Hypothalamus
NM_020515	Ora16	gene for odorant receptor A16	signaling (receptor)	Midbrain
			signaling (receptor)	Midbrain
NM_020291	Ora25	odorant receptor S25	signaling (receptor)	Hypothalamus
NM_020290	Ora18	odorant receptor S18 gene	signaling (receptor)	Midbrain
NM_020288	Ora1	odorant receptor S1 gene [Mus musculus] 100 %	signaling (receptor)	Hypothalamus
NM_020278	Lgi1	leucine-rich repeat LGI family, member 1	miscellaneous (receptor)	Hypothalamus
NM_019691	Gria4	glutamate receptor ionotropic ampa4 alpha 4 gria4	signaling (receptor)	Hypothalamus
NM_019583	Il17br	interleukin 17B receptor	signaling (receptor)	Hypothalamus
NM_019485	Olf670	olfactory receptor 70	signaling (receptor)	Cortex
			signaling (receptor)	Cortex
NM_019421		hypothetical protein 425O18-1	metabolism (receptor)	Hypothalamus
NM_018766	Ntar	neurotensin receptor	signaling (receptor)	Hypothalamus
NM_017480	Icos	inducible T-cell co-stimulator	immune response (receptor)	Midbrain
NM_016719	Grb14	growth factor receptor bound protein 14	signaling (receptor)	Hypothalamus
NM_016696	Gpc1	glypican 1	signaling (receptor)	Midbrain
NM_015743	Nr4a3	nuclear receptor subfamily 4, group A, member 3	transcription (receptor)	Midbrain
NM_015845	Ror1	receptor tyrosine kinase-like orphan ror1 - ROR1_MOUSE Tyrosine-protein kinase transmembran	signaling (receptor)	Midbrain
NM_015728	Olf154	olfactory receptor 154	signaling (receptor)	Hypothalamus
			signaling (receptor)	Midbrain
NM_015662	Sema6b	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6B	signaling (receptor)	Hypothalamus
NM_015658	Sema4a	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic d	signaling (receptor)	Cortex
NM_015622	Opr1	opioid receptor, delta 1	signaling (receptor)	Hypothalamus
NM_015619	Olf67	olfactory receptor 67	signaling (receptor)	Midbrain
			signaling (receptor)	Cortex
NM_015618	Olf66	olfactory receptor 66	signaling (receptor)	Hypothalamus
NM_015584	Lif	leukemia inhibitory factor receptor	signaling (receptor)	Hypothalamus
			signaling (receptor)	Hypothalamus

FIGURE 25C

Accession	Gen	Description	Class	Region
NM_013483	Bst1a1	buryophilin, subfamily 1, member A1	immune response (receptor)	Midbrain
NM_013476	Ar	androgen receptor	transcription (receptor)	Cortex
NM_011976	Sema4g	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic d	signaling (receptor)	Hypothalamus
NM_011798	Xcr1	chemokine (C motif) receptor 1	signaling (receptor)	Midbrain
NM_011519	Sdel	syndecan 1	signaling (receptor)	Hypothalamus
NM_011216	Ptpro	protein tyrosine phosphatase, receptor type, O	signaling (receptor)	Hypothalamus
NM_010482	Htr1b	5-hydroxytryptamine (serotonin) receptor 1B	signaling (receptor)	Midbrain
NM_010346	Grb7	growth factor receptor bound protein 7 clone mgc5653; epidermal receptor-binding grb7	growth factor (receptor)	Cortex
NM_010338	Gpr37	G protein-coupled receptor 37	signaling (receptor)	Hypothalamus
NM_010317	Gng4	guanine nucleotide binding protein (G protein), gamma 4 subunit	signaling (receptor)	Hypothalamus
NM_010254	Gabr2	galanin receptor 2	signaling (receptor)	Midbrain
NM_010077	Drd2	dopamine receptor 2	signaling (receptor)	Hypothalamus
NM_009912	Ccr1	chemokine (C-C motif) receptor 1	signaling (receptor)	Hypothalamus
NM_009903	Cldn4	claudin 4	signaling (receptor)	Midbrain
NM_008886	Celsr1	cadherin egl lag seven-pass s-type receptor celsr1	signaling (receptor)	Hypothalamus
NM_008827	Cckar	cholecystokinin A receptor	cell adhesion (receptor)	Midbrain
NM_009602	Chrb2	cholinergic receptor, nicotinic, beta polypeptide 2 (neuronal)	signaling (receptor)	Midbrain
NM_009521	Wnt5	wingless-related MMTV integration site 3	signaling (receptor)	Hypothalamus
NM_009493	V2r4	vomeronasal 2, receptor, 4	receptor	Cortex
NM_009370	Tgfbri	transforming growth factor beta receptor 1	signaling (receptor)	Midbrain
NM_009290	Wntla	wingless-related MMTV integration site 8A	signaling (receptor)	Hypothalamus
NM_009102	Rrh	retinal pigment epithelium derived rhodopsin homolog	signaling (receptor)	Hypothalamus
NM_008962	Ptgdr	prostaglandin D receptor	signaling (receptor)	Cortex
NM_008958	Pch2	patched homolog 2	signaling (receptor)	Midbrain
NM_008938	Rds	retinal degeneration, slow (retinitis pigmentosa 7)	signaling (receptor)	Cortex
NM_008746	Ntrk3	neurotrophic tyrosine kinase, receptor, type 3	signaling (receptor)	Hypothalamus
NM_008720	Npc1	niemann pick type c1	signaling (receptor)	Hypothalamus
NM_008716	Notch3	Notch gene homolog 3 (Drosophila)	signaling (receptor)	Midbrain
NM_008703	Nmbw	neuromedin B receptor	signaling (receptor)	Hypothalamus
NM_008561	Mclr	melanocortin receptor	signaling (receptor)	Cortex
NM_008533	Ly78	lymphocyte antigen 78 ly78	signaling (receptor)	Hypothalamus
NM_008479	Lyg3	lymphocyte-activation gene 3	immune response (receptor)	Hypothalamus
NM_008353	Il12rb1	interleukin 12 receptor, beta 1	immune response (receptor)	Hypothalamus
NM_008348	Il10ra	interleukin-10 receptor alpha	signaling (receptor)	Cortex
NM_008338	Ifngr2	interferon gamma receptor 2	immune response (receptor)	Midbrain
NM_008315	Htr7	5-hydroxytryptamine (serotonin) receptor 7	signaling (receptor)	Hypothalamus
NM_008308	Htr1a	5-hydroxytryptamine serotonin receptor 1a htr1a	signaling (receptor)	Hypothalamus
NM_008106	Opa1mw	opsin 1 (cone pigments), medium-wave-sensitive (color blindness, deutan)	signaling (receptor)	Cortex
NM_008076	Gabr2	gamma-aminobutyric acid gaba-a receptor subunit rho 2 gabr2	signaling (receptor)	Hypothalamus
NM_008074	Gabr3	gamma subunit of the gaba-alpha receptor	signaling (receptor)	Hypothalamus
NM_008070	Gabr2	gamma-aminobutyric acid gaba-a receptor subunit beta 2 gabr2	signaling (receptor)	Hypothalamus
NM_008069	Gabr1	gamma-aminobutyric acid (GABA-A) receptor, subunit beta 1	signaling (receptor)	Hypothalamus
NM_008055	Fzd4	frizzled homolog 4 drosophila fzd4	signaling (receptor)	Midbrain
NM_008052	Dlx1	distal-less 1	signaling (receptor)	Cortex
NM_007939	EphA8	Eph receptor A8	signaling (receptor)	Hypothalamus
NM_007904	Ednrb	endothelin-b receptor ednrb	signaling (receptor)	Hypothalamus
NM_007900	Ect2	ect2 oncogene	signaling (receptor)	Hypothalamus
NM_007833	Dcn	decorin	signaling (receptor)	Cortex
NM_007407	Adcyap1r1	adenylate cyclase activating polypeptide 1 receptor 1	signaling (receptor)	Midbrain
M34173	Crry	complement receptor related protein	immune response (receptor)	Cortex
D26157	Pgir	prostanoid receptor	signaling (receptor)	Midbrain
BC004794	Frag1	FGF receptor activating protein 1	signaling (receptor)	Cortex
AK019508		cadherin EGF LAG seven-pass G-type receptor 1, cadherin EGF LAG seven-pass G-type receptor	signaling (receptor)	Hypothalamus
AK017036			signaling (receptor)	Hypothalamus
AK014543		progesterone membrane binding protein (73% Homo sapiens)	signaling (receptor)	Hypothalamus
AK014326	Sreb3	SREB3	signaling (receptor)	Hypothalamus
AK013804	P2ry12	purinergic receptor P2Y, G-protein coupled 12	signaling (receptor)	Midbrain
AK013276		Similar to type I transmembrane receptor (seizure-related protein) (37% Homo sapiens)	signaling (receptor)	Hypothalamus
AK012717		RIKEN cDNA 2810011M08 gene	signaling (receptor)	Cortex
AK010800		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse	immune response (receptor)	Cortex
AK010727		157963 natriuretic peptide receptor A - mouse 50.36 %	signaling (receptor)	Hypothalamus
AK009282		RIKEN cDNA 2310010M24 gene	signaling (receptor)	Midbrain
AJ011106	Clcn1	chloride channel 1	transport/receptor	Midbrain
AF282302	MOR224-6	olfactory receptor MOR224-6	signaling (receptor)	Hypothalamus
AF282300		Mus musculus odorant receptor M15 gene	signaling (receptor)	Hypothalamus
AF282291	MOR171-8	olfactory receptor MOR171-8	signaling (receptor)	Midbrain
AF133300	mor17-1	olfactory receptor mor17-1	signaling (receptor)	Cortex
AF056187	Igf1r	insulin-like growth factor i receptor igf1	signaling (receptor)	Hypothalamus
AF045766	Gpr33	orphan g protein-coupled receptor gpr33 related to chemoattractant receptors	signaling (receptor)	Midbrain
				Hypothalamus

FIGURE 25D

Lung Cancer

Accession	Gen	Description	Class	Region
X59150	Tcrb-V20	T-cell receptor beta, variable V20	signaling (receptor)	Cortex
X51552	Fgf6	fibroblast growth factor 6	signaling (receptor)	Striatum
U82439	Pppm2	protein tyrosine phosphatase 48-2beta ppp an autoantigen in insulin-dependent diabetes mellitus, ph	signaling (receptor)	Cortex
NM_053094	Cd163	CD163 antigen	signaling (receptor)	Midbrain
NM_033269	Chrm3	ACM1_MOUSE Muscarinic acetylcholine receptor M3 (Mm3 mAChR) 100 %	signaling (receptor)	Cortex
NM_032400	Gpr91	G protein-coupled receptor 91	signaling (receptor)	Midbrain
NM_032002	Nrg4	neuregulin 4 nrg4	signaling (receptor)	Cortex
NM_031879	Ptpn	pleckstrin homology domain interacting protein	signaling (receptor)	Midbrain
NM_031373	Ogfr	opioid growth factor receptor	signaling (receptor)	Midbrain
NM_031257	Plekha2	pleckstrin homology domain-containing, family A (phosphoinositide binding specific) member 2	signaling (receptor)	Cortex
NM_030735	V3R9	pheromone receptor V3R9	signaling (receptor)	Hypothalamus
NM_030726	Gpr90	G protein-coupled receptor 90	signaling (receptor)	Striatum
NM_030701	Puma-g	putative seven transmembrane spanning receptor puma-g	signaling (receptor)	Cortex
NM_030553	Olf160	Olf160	signaling (receptor)	Striatum
NM_030258	Irfk4	hypothetical protein, MGC.7035; hypothetical protein MGC7035 (Mus musculus) 100 %	signaling (receptor)	Hypothalamus
NM_029926	Ms4a6e	interleukin-1 receptor-associated kinase 4	immune response (receptor)	Cortex
NM_028595	Cntnap2	membrane-spanning 4-domains, subfamily A, member 6C	immune response (receptor)	Hypothalamus
NM_025771	Gpr88	contactin associated protein-like 2	cell adhesion (receptor)	Midbrain
NM_022427	Fzd3	G-protein coupled receptor 88	signaling (receptor)	Cortex
NM_021458	Trem3	frizzled homolog 3 drosophila fzd3	signaling (receptor)	Midbrain
NM_021407	Otr16	triggering receptor expressed on myeloid cells 3	signaling (receptor)	Hypothalamus
NM_021368	Clec4e5	odorant receptor 16	signaling (receptor)	Striatum
NM_021364	Gip1r	C-type (calcium dependent, carbohydrate-recognition domain) lectin, superfamily member 5	immune response (receptor)	Midbrain
NM_021332	Mor2r	glucagon-like peptide 1 receptor	signaling (receptor)	Striatum
NM_021325	Pgltpl	antigen identified by monoclonal antibody MRC OX-2 recepto	signaling (receptor)	Midbrain
NM_021319	Ora16	peptidoglycan recognition protein-like	signaling (receptor)	Cortex
NM_020515	MOR32-4	gene for odorant receptor A16	signaling (receptor)	Hypothalamus
NM_020292	Itp2	olfactory receptor MOR32-4 - odorant receptor S46 gene (Mus musculus) 97 %	miscellaneous (receptor)	Cortex
NM_019923	Gria4	inositol 1,4,5-trisphosphate receptor 2	signaling (receptor)	Midbrain
NM_019691	I117br	glutamate receptor ionotropic ampa4 alpha 4 gria4	signaling (receptor)	Hypothalamus
NM_019583	Olf159	interkaskin 17B receptor	signaling (receptor)	Cortex
NM_019476	Sfrp5	olfactory receptor 159	signaling (receptor)	Midbrain
NM_018780	Wisp2	secreted frizzled-related sequence protein 5	signaling (receptor)	Cortex
NM_016873	Gpc1	WNT1 inducible signaling pathway protein 2	signaling (receptor)	Hypothalamus
NM_016696	Nr4a3	glypican 1	signaling (receptor)	Cortex
NM_015743	Galsr3	nuclear receptor subfamily 4, group A, member 3	transcription (receptor)	Striatum
NM_015738	Axin2	galanin receptor 3	signaling (receptor)	Midbrain
NM_015732	Ror1	axin2	signaling (receptor)	Striatum
NM_013843	Slam	receptor tyrosine kinase-like orphan ror1 - ROR1_MOUSE Tyrosine-protein kinase transmembran	signaling (receptor)	Hypothalamus
NM_013730	Olf154	signaling lymphocyte activation molecule	signaling (receptor)	Cortex
NM_013728	Sema6b	olfactory receptor 154	signaling (receptor)	Hypothalamus
NM_013662	Sema4a	sema domain, transmembrane domain (TM), and cytoplasmic domain, (semaphorin) 6B	signaling (receptor)	Midbrain
NM_013658	Olf66	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic d	signaling (receptor)	Cortex
NM_013619	Olf66	olfactory receptor 67	signaling (receptor)	Striatum
NM_013618	Lifr	olfactory receptor 66	signaling (receptor)	Cortex
NM_013584	Fpr1	leukemia inhibitory factor receptor	signaling (receptor)	Hypothalamus
NM_013521	Bu1a1	formyl peptide receptor 1	signaling (receptor)	Cortex
NM_013483		butyrophilin, subfamily 1, member A1	signaling (receptor)	Striatum
NM_013476	Ar		immune response (receptor)	Midbrain
NM_013415	Wif1	androgen recept	transcription (receptor)	Cortex
NM_011798	Xcr1	Wnt inhibitory factor 1	transcription (receptor)	Hypothalamus
NM_011776	Zp3	chemokine (C motif) receptor 1	signaling (receptor)	Striatum
NM_011342	Htr1b	zona pellucida glycoprotein 3	signaling (receptor)	Cortex
NM_011302	Gna12	5-hydroxytryptamine (serotonin) receptor 1B	signaling (receptor)	Striatum
NM_009988	Ccr2	guanine nucleotide binding protein, alpha 12	signaling (receptor)	Hypothalamus
NM_009914	Ccr3	coxsackievirus and adenovirus receptor	signaling (receptor)	Striatum
NM_009866	Cldn4	chemokine (C-C) receptor 3	signaling (receptor)	Cortex
NM_009866	Cldn4	claudin 4	immune response (receptor)	Hypothalamus
NM_009866	Cldn4	cadherin egf/Tag seven-pass g-type receptor cldn4	signaling (receptor)	Cortex
NM_009866			cell adhesion (receptor)	Striatum
NM_009866				Hypothalamus

FIGURE 25E

Accession	Gen	Description	Class	Region
NM_009854	Cd7	cd7 antigen	immune response (receptor)	Hypothalamus
NM_009827	Cckar	cholecystokinin A receptor	signaling (receptor)	Cortex
NM_009524	Wnt5a	wingless-related MMTV integration site 5A		Striatum
NM_009504	Vdr	vitamin d receptor	signaling (receptor)	Hypothalamus
NM_009493	V2r4	vomer nasal 2, receptor, 4	signaling (receptor)	Midbrain
NM_008962	Pgdr	prostaglandin D receptor	receptor	Hypothalamus
NM_008938	Rds	retinal degeneration, slow (retinitis pigmentosa 7)	signaling (receptor)	Cortex
NM_008746	Nrk3	neurotrophic tyrosine kinase, receptor, type 3	cell adhesion (receptor)	Hypothalamus
			signaling (receptor)	Cortex
NM_008716	Notch3	Notch gene homolog 3 (Drosophila)	signaling (receptor)	Hypothalamus
				Midbrain
				Striatum
NM_008702	Nmr1	neuromedin B receptor	signaling (receptor)	Hypothalamus
NM_008559	Metr	metanocortin 1 receptor	signaling (receptor)	Hypothalamus
NM_008512	Lrp1	low density lipoprotein receptor-related protein 1	signaling (receptor)	Hypothalamus
NM_008479	Lag3	lymphocyte-activation gene 3	signaling (receptor)	Midbrain
			immune response (receptor)	Midbrain
NM_005401	Igah	integrin alpha H		Hypothalamus
NM_001398	Iga7	integrin alpha 7	cell adhesion (receptor)	Hypothalamus
NM_001364	Il1rap	interleukin 1 receptor accessory protein	cell adhesion (receptor)	Striatum
			signaling (receptor)	Cortex
NM_001353	Il12rb1	interleukin 12 receptor, beta 1	signaling (receptor)	Hypothalamus
				Midbrain
				Cortex
NM_008348	Il10ra	interleukin-10 receptor alpha	signaling (receptor)	Hypothalamus
				Cortex
				Striatum
NM_001338	Ifngr2	interferon gamma receptor 2	immune response (receptor)	Hypothalamus
NM_001285	Hrb1	histamine receptor H 1	signaling (receptor)	Hypothalamus
				Cortex
				Hypothalamus
NM_001172	Grin2d	glutamate receptor channel subunit epsilon 4	signaling (receptor)	Striatum
NM_001164	Grid1	glutamate receptor ionotropic delta grid 1	signaling (receptor)	Hypothalamus
NM_001106	Opn1mw	opsin 1 (cone pigments), medium-wave-sensitive (color blindness, deutan)	signaling (receptor)	Hypothalamus
NM_008070	Gabbr2	gamma-aminobutyric acid gaba-a receptor subunit beta 2 gabrb2	signaling (receptor)	Hypothalamus
NM_008069	Gabbr1	gamma-aminobutyric acid (GABA-A) receptor, subunit beta 1	signaling (receptor)	Cortex
NM_008058	Fzd8	putative transmembrane receptor frizzled 8	signaling (receptor)	Hypothalamus
NM_008055	Fzd4	frizzled homolog 4 drosophila fz4	signaling (receptor)	Midbrain
NM_007975	Fzr3	protease-activated receptor 4 par4 g protein-coupled receptor thrombin	signaling (receptor)	Cortex
NM_007975	Fzr3	protease-activated receptor 4 par4 g protein-coupled receptor thrombin	signaling (receptor)	Midbrain
NM_007939	EphA8	Eph receptor A8	signaling (receptor)	Hypothalamus
NM_007904	Ednrb	endothelin-b receptor ednrb	signaling (receptor)	Cortex
NM_007779	Csflr	c-fms proto-oncogene protein precursor aa -19 to 957; adult male liver riken cdna clone:1300000n2	signaling (receptor)	Hypothalamus
NM_007699	Chrm4	cholinergic receptor muscarinic 4 chrm4	signaling (receptor)	Hypothalamus
NM_007412	Admr	adrenomedullin receptor	signaling (receptor)	Midbrain
M36699	Rho	rhodopsin	signaling (receptor)	Cortex
L24495	Tnfrsf7	tumor necrosis factor receptor superfamily, member 7	signaling (receptor)	Cortex
L07379	Ghrhr	(clone pm7) growth hormone-releasing factor receptor	signaling (receptor)	Striatum
BC016104	Gpr108	G protein-coupled receptor 108	signaling (receptor)	Hypothalamus
BC007481	Plxnb2	plexin B2	signaling (receptor)	Striatum
AK017036			signaling (receptor)	Striatum
AK016763		RIKEN cDNA 4913411B03 gene	signaling (receptor) ?	Striatum
AK015192		interleukin 6 receptor, alpha; IL-6 receptor alpha chain [62% Mus musculus]	signaling (receptor)	Striatum
AK014671		antigen identified by monoclonal antibody MRC OX-2 receptor (41% Mus musculus)	signaling (receptor)	Striatum
AK014543		progesterone membrane binding protein [73% Homo sapiens]	signaling (receptor)	Midbrain
				Hypothalamus
				Midbrain
				Cortex
AK014326	Srebf3	SREB3	signaling (receptor)	Hypothalamus
AK013804	P2ry12	purinergic receptor P2Y, G-protein coupled 12	signaling (receptor)	Hypothalamus
AK011967	P2ry5	purinergic receptor (family A group 5)	signaling (receptor)	Striatum
AK010800		Similar to A40038 MHC class I histocompatibility antigen H-2 M3 alpha chain precursor - mouse	signaling (receptor)	Hypothalamus
			immune response (receptor)	Midbrain
AK010720		Similar to seven transmembrane protein TM7SF3 [82% Homo sapiens]	signaling (receptor)	Hypothalamus
AK009282		RIKEN cDNA 2310010M24 gene	signaling (receptor)	Hypothalamus
				Midbrain
				Cortex
AK004472		polycythemia rubra vera 1; cell surface receptor; cell surface receptor [Homo sapiens] 49 %	signaling (receptor)	Hypothalamus
				Midbrain
				Hypothalamus
AJ011106	Clcn1	chloride channel 1	transport/receptor	Hypothalamus
AF282302	MOR224-6	olfactory receptor MOR224-6	signaling (receptor)	Midbrain
AF282301	MOR224-4	olfactory receptor MOR224-4	signaling (receptor)	Midbrain
			signaling (receptor)	Midbrain
AF282291	MOR171-8	olfactory receptor MOR171-8	signaling (receptor)	Hypothalamus
AF282286		Mus musculus odorant receptor K30 gene	signaling (receptor)	Cortex
AF133300	mor17-1	olfactory receptor mor17-1	signaling (receptor)	Cortex
AF056187	Igf1r	insulin-like growth factor i receptor igf1	signaling (receptor)	Cortex
			signaling (receptor)	Striatum
AF045766	Gpr33	orphan g protein-coupled receptor gpr33 related to chemoattractant receptors	signaling (receptor)	Hypothalamus
AF027131	Muc3	mucin 3, intestinal	signaling (receptor)	Hypothalamus
			signaling (receptor)	Cortex

FIGURE 26

CNS markers differentially expressed in all tumors analyzed

Accession	Gen	Description	Class	Tumor	Region
N72307	Hgf	hepatocyte growth factor	growth factor	Colon Breast Lung	Cortex Midbrain Cortex Midbrain Cortex Striatum Hypothalamus
U52885	Erna3	apherin A3	growth factor	Colon Breast Lung	Cortex Cortex Striatum
NM_013852	Ccl4	chemokine (C-C motif) ligand 4	growth factor	Colon Breast Lung	Striatum Striatum Cortex Hypothalamus Cortex
NM_009757	Bmp15	growth differentiation factor-9b gdf-9b; bone morphogenetic protein 15 bmg	growth factor	Colon Breast Lung	Striatum Midbrain Cortex Midbrain Cortex Hypothalamus Midbrain
NM_006675	Nbl1	neuroblastoma, suppression of tumorigenicity 1	tumor related (secreted)	Colon Breast Lung	Striatum Hypothalamus Midbrain Hypothalamus Cortex
AK017955	Myg1	melanocyte proliferating gene 1	signaling (secreted)	Colon Breast Lung	Midbrain Striatum Hypothalamus Midbrain Cortex Striatum Hypothalamus Hypothalamus
AK008922	Fgf22	fibroblast growth factor 22	growth factor	Colon Breast Lung	Striatum Hypothalamus Striatum Cortex Hypothalamus Midbrain Cortex



ABSTRACT

The invention features methods and compositions for diagnosing non-central nervous system (non-CNS) disorders by detecting changes in gene expression in the CNS.

5

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